

SL-11 NC-1344/1

Time: 00:32 CDT, 29:05:32 GMT

6/22/73

CC Skylab, Houston through Goldstone for
9 minutes.

CDR

Okay, Houston.

CC

Skylab, Houston; about 2 minute to LOS.

Bermuda at 46.

CDR

Roger, Houston. We're just about
running 20 minutes ahead, just nice and comfortable.

CC

Roger. Copy.

CC

CDR, Houston. Just want to fill you
on what we're thinking about - we're considering a 45-degree
pitch maneuver for the SWS to - put the radiator in the Sun
a little bit, and we haven't made our mind whether we want to
do with the SWS or the CSM.

CDR

We'd just as soon let you guys have the
SWS.

CC

Roger. Copy, and we're about LOS.

PAO

Skylab Control at 5 hours 42 minutes
and 53 seconds Greenwich mean time. We have lost signal
for about 3 minutes as we pass out of range near the
Goldstone tracking station and expect to acquire again
at Bermuda. Just as we ended that pass, spacecraft
communicator Henry Hartsfield gave a callup and indicated
that we may be doing an attitude change, a maneuver - a
pitch maneuver of 45 degrees to attempt to point that
radiator on the end of the workshop toward - more toward
the Sun to get a little sunlight on it. There is some
belief over here that the radiator may have frozen up and that
may be the cause for temperature increases. Those temperatures
now as of Goldstone were ranging at about the 4- to 6-degree
area on the freezers. One of the urine freezers is
bit higher at 10 degrees, and that's at the upper limit of the
long-term storage levels. It's desired to keep them below
10 degrees. Most of those now are reading about 4 to 6
degrees. No indication one way or the other whether this
is going to continue or stop. One of the outlet temperatures
has, in fact, come down a bit, and that may be a sign that
it's changing. Inside the orbital workshop, the temperatures
have gone up because of the high Beta angles we mentioned
earlier. It's believed that those Beta angles, by, in fact,
have had some effect on the temperature of the radiator because
of the angle of the radiator to the albedo of the earth. That
is to say, the reflected light from the earth may not be shining
as directly on the radiator and for that reason, the radiator
may be colder than usual and may in fact have frozen up some of
the coolant. At least to this point, it appears quite clear
that that's not a serious problem and not likely to have any
effect on the undocking this morning at 3:45 p.m. central
daylight time. Most of the maneuvers can be performed

SL-11 NC-1330/1

Time: 19:59 CDT, 29:00:59 GMT

6/21/73

CDR Would it have been a message that we put it in the Systems Book?

CC Okay. It sounds like that, we'll put that on the teleprinter for you.

CDR Very good.

CC And we have 1 minute to LOS; we'll see you at Madrid in about 3 minutes from now.

FAO Skylab, Control at 1 hour and 20 seconds Greenwich Mean Time. We have lost signal over our Bermuda station after a pass through Merritt Island and Bermuda. And we'll acquire signal again at Madrid in approximately 3 minutes. The crew awakened about 7:30 P.M. Central Daylight Time tonight, just about an hour ago. And they were told by Spacecraft Communicator Karl Henize that we'd looked all over Houston for a song to play up to them - an appropriate wakeup song. He said they were looking for Rubber Ducky, that was a reference to yesterday morning, when Kerwin, the Science Pilot, called down and said he was all ready to go, but he couldn't find his rubber ducky anywhere, and then shortly after that we heard the sound of a rubber duck - the kind of squeal that's made by the rubber duck and Kerwin said "Oh, here it is. I'm ready to go now." So, we looked for Rubber Ducky to wake them up, but didn't have any luck on that. We had - a medical status report was sent up to - the crew at Honey-suckle tonight, on the teleprinter. That medical status report indicates that the winner of the Butter Cookie Derby is Pete Conrad. Pete Conrad has eaten 40 cans of butter cookies in 28 days. That sets a new record for that period of time. Joe Kerwin was second with 32 cans of butter cookies, and it nearly surpassed the record set by Astronaut Bill Thornton 49 cans in 56 days. Twice as long a period of time so it indicated that the Thornton record will carry an asterisk like that carried by Roger Marris in the home run hitting area and there also on the message is a comment that 20 cans of cookies will be waiting on the TICO, the U.S.S. Ticonderoga. This is Skylab Control. We're about 2 minutes from acquisition of signal at Madrid. Crew had a busy day yesterday. They were awakened at about 1:00 A.M. Houston time, Thursday. They had a busy day going through various deactivation procedures, mostly storing parts away and getting rid of rubbish in the area. They were given instructions earlier to - on the going home instructions sent up on the teleprinter, they were told to sweep out the Skylab workshop, turn the refrigerator on low, turn out the lights, terminate the paper delivery, set the thermostat, inform their neighbors that they'll be gone at least a month, put the garbage out, and pray for a pickup, and also to put the cat out. This is Skylab Control. We're 1 minute from

SL-II NC-1331/1

Time: 20:35 CDT, 29:01:33 GMT

6/21/73

PAO Skylab Control at 1 hour 35 minutes and 19 seconds Greenwich mean time. We are now approaching acquisition of signal at our Carnarvon tracking station in Australia. We expect to acquire signal there in 1 minute and 45 seconds. This is Skylab Control. We'll remain live for air-to-ground from Carnarvon.

CC Skylab, Houston through Carnarvon for 10 minutes.

CDR Roger.

PLT Good morning, Henry. Hey, I just wanted you to know - wait until I find the other speaker.

PLT Okay, Hank. In proceeding through the close-out, I'm not closing out - turning off the heat exchanger fans yet. And I got a question. The instrumentation selectors - you want them left on Charlie Charlie - is - I heard you say something yesterday. Is that where you want them left?

CC We'd like to close them out per checklist.

PLT Okay.

CDR I've got some numbers for you. Ready to copy?

CC Go ahead.

CDR Okay, this is the morning-evening status report for day 29. There is no Alfa for you. There is no Bravo. Charlie the Chair 27003 27004 27003. The CDR, 6073, 6074, 6076. The SPT 6625, 6634, 6625. The PLT 6738, 6738, 6738. There is no Delta. There is no Echo. Last night, you'll have to add to our last night's food. The Commander, 1 cherry drink; the SPT, 1 cherry drink; the PLT, 10 ounces of H2O. This morning the Commander had 1 cherry juice vice his coffee with sugar, 'cause who wants cold coffee with sugar. Yuk. The SPT had an orange vice his cold coffee. And the PLT had 1 cherry.

CC Roger. We copy.

CDR And the PLT had no coffee either.

CDR Have to add a - SPT didn't have his grapefruit drink with breakfast for the TT as listed - Two T's, because I think there's snacks or something.

CC Roger.

CDR Here comes the computer.

CC PLT, Houston. Just a reminder there, you can go ahead and configure panel 617 and heat exchanger panels to stay on until you reconfigure panel 390 because we're running them in manual.

PLT Okay. Good. I'd forgotten that, Hank.

Thank you.

CDR (Garble) checklist all right.

CC Roger. We concur.

SL-11 MC-1331/2

Time: 20:35 CDT, 29:01:35 GMT

6/21/73

CC CDR, Houston. We can take an E-mod now if you're ready, or (garble) 74.

CDR Okay, is it all right to send you that while it's doing an (garble) there, or should I wait until the computer gets the - the INUs up?

CC Stand by.

CC Okay, CDR. After the turn-on sequence is complete we'll be ready. That takes about 90 seconds.

CDR Okay.

CC We've only got about 2 minutes left here. Why don't we hold that - Honeysuckle. We might get a crop-out in data here between Carnary n and Honeysuckle, here. It looks like about 20 seconds or so.

CDR Okay. We'll hold her.

END OF TAPE

SL-11 NC-1332/1

Time: 20:47 GMT 20:01:47 GMT

6/21/73

CC Skylab, we're back up again through
Honeysuckle for about 4-1/2 minutes.

CDR

Okay. Here comes your (garble)

CC

Okay. We're ready.

CDR

Got it.

CC

Skylab, Houston. For info, we have re-transmitted to you message 103; that's the message we sent up way early in the mission for mating the probe and drogue and we retransmitted the contingency undock procedure just to make sure you have both of those on board. They should be in the teleprinter.

PAO Skylab Control at 1 hour and 54 minutes and 11 seconds Greenwich mean time. We're now out of range of the Honeysuckle tracking station, and we have 27 minutes and 52 seconds until acquisition of signal at Texas. The crew should now be ready to begin activating the power systems of the command module, which has been low powered using about 800 to 1,000 watts of electricity from the solar powered electrical systems of the Skylab cluster. Beginning the next few hours, we will change over to power within the command module rather than using that electrical power generated by the space station itself. While Commander Conrad brings up the command module power, Chief Scientist Joseph Kerwin will shut down the waste processing equipment, and close out the computer control and display panel that is used for conducting solar experiments on the Apollo telescope mount. Pilot Paul Weitz will assist in both the command module power-up and in the final steps of deactivating the space station for the coming month of unmanne! operation. That command module activation begins about now, and it should take them approximately 2 hours 40 minutes to complete activation. Following the activation of the command module and the other activities required to power down the orbital workshop and other areas of the Skylab cluster, the crew will don their suits beginning at about 4:40 Greenwich mean time. That's about 20 minutes before midnight tonight, and that should take them about an hour and 10 minutes. Suit donning will be completed then, and closeout of the space station takes place between 05:50 and 07:00 Greenwich mean time, before 2:00 a. m. central daylight time, and then preparations are made to undock the orbital - undock the command module from the space station. This is Skylab Control. We're 23 minutes and 7 seconds from acquisition of signal at the Corpus Christi, Texas antenna, and we will return before that time. It's now 56 minutes and 20 seconds after the hour.

END OF TAPE

SL-11 MC-1333/1

Time: 21:18 CDT, 29:02:18 GMT

6/21/73

PAO This is Skylab Control at 2 hours 18 minutes and 45 seconds Greenwich Mean Time, we're now about a minute and a half from acquisition of signal at our Texas station. We - we'll stay alive for air-to-ground from Texas.

CC Skylab, Houston. Stateside for 16-1/2 minutes.

CDR Roger. You want (garble) accept.
CC That's affirmative, Sir. We're ready with your unlinks and we're also stand by to monitor your SPS repress on page 2-12.

CDR Okay that's coming up right now and you got (garble)

CC Now wait a minute, Pete. We don't have any data yet.

CDR Oh, okay.
CC Okay, CDR. Data looks good now, you can go ahead.

CDR Okay.
CDR (garble) zero pressurizing (garble) degrees, (garble) it must be on the ground.
CC Say again, Pete. We had a poor comm here.

CDR I said, it's barely coming it into the green now, how does it look to you on the ground.

CC Okay. We're having data problems again, soon as we get it squared away, we'll take a look at her.

CDR That's nothing new.

CC CDR, Houston. We're seeing the pressures now and they both look good to us.

CDR I indicate that it's still slowly crawling up. I ask whether you want me go to Delta, you want me to go and come back to auto now.

CC Okay, CDR. You can go back to AUTO.

CDR Roger.

CC And CDR, for info we retransmitted the message on hooking the probe and drogue together and the contingency undock procedures and both of those should be in the teleprinter.

CDR Looks to me like now we got the one message, which is the one we already have.

CC You - are you saying you don't have message 0105 onboard?

CDR That's right, you sent me the other one. That I already had.

CC Okay. We'll check that out Pete. We haven't - if we find we haven't sent 0105, we'll resend it. That's the one that's hook photo - the probe and drogue together.

CDR The message you transmitted was 2317B1 which I already got.

SL-11 NC-1333/2

Time: 21:18 CDT, 19:02:11 GMT

6/21/73

CC

Okay, the reason we sent that one, we just wanted to make sure you had it. I know you said you had it, but we did it just as a precautionary measure and we will ensure that you get the other message. We'll send it again.

CDR

You guys don't trust me or something?

END OF TAPE

SL-11 MC-1334/1

Time: 21:28 CDT, 29:02:28 GMT

6/21/75

CT Texas comm tech, Houston, comm techs nat 1.
CT Texas comm tech.
CT Read you loud and clear.
CDR Hi, Houston. Are you there?
CC Roger. Go ahead.
CC CDR, Houston. Go ahead.
CC CDR, Houston. We had a handover then.
We're standing by.
CC CDR, Houston.
CDR Go ahead.
CC Okay. Were you calling just a moment ago?
We had a handover there, and you were cut out.
CDR Yes, what is the undocking time?
CC Roger. It should be on the pad we sent
up.
CDR Okay. We'll use that one.
CC Okay. It's still good. 15:34:13 and 1
also have your P52 stars for you that goes on page 2-32, 730.
CC I guess that's really about 740 in the
Flight Plan now.
CDR What's the page?
CC Page 2-32.
CC That'll be stars 37 and 42.
CDR Roger. Stars 37 and 42. The undock time's
15:34:13. Right?
CC That's affirmative. And your up-links are
complete.
CDR Yes, coming back tomorrow.
CC Skylab, Houston. Whenever it's convenient,
we'd like to get an update from the SPT and the PLT.
PLT Okay, the SPT has the urine lockers stowed
in the command module; is presently stowing A-7.
CC Roger; copy.
PLT The PLT is in a short hold, waiting for the
time to come up. We're going to do the command module's
power transferred internal.
CC Roger. We copy.
CC CDR, Houston. That message 105 ought to
be on board now.
PLT Okay.
CC Skylab, Houston. We're 1 minute to LOS.
Madrid's coming up at 41 with a recorder down.
PLT Roger.
PAO Skylab Control at 2 hours 37 minutes and
40 seconds Greenwich mean time. We have lost signal over
our - our Bermuda tracking station and expect to acquire again
in a little over 1 minutes at Madrid. Should take nearly

SL-11 NC-1334/2

Time: 21:28 CDT, 29:02:28 GMT

6/21/73

3 hours for the crew to complete the procedures required to activate the command module, and to also complete the major closeout procedures on America's first space station. During this last pass Commander Conrad was powering up the SPS - that's the main engine, the service propulsion system engine of the command module, pressurizing those tanks - fuel and oxygen tanks on the SPS. And - that's done manually up there and then put back in automatic once the pressure reaches the proper level. So, that was completed during this last pass as part of the activation of the command module. At the same time, the other two crew members are working on deactivation of the orbital workshop and other areas of the spacecraft. Shortly before midnight tonight, Houston time, the crew members are scheduled to begin getting into their suits. One of the crew members, however, will remain unsuited until after the tunnel is closed up. We expect that MDA hatch closing to take place about 1:10 a.m. Previous to that, the - one of the crew members will be asked to participate in the probe and - probe and drogue activities. That was the teleprinter pad mentioned during this last pass that - that had not been sent up in time for the crew, and that was sent up over the United States, so they'll be taking a look at that very shortly. That teleprinter pad gives interim docking procedures that, assuming the probe cannot locked and drogued normally, the summary it requires shortly - it requires the crewmen with the longest reach to remain unsuited until after the tunnel close-out. That's the probe and drogue installation. The concept is to mate the probe and drogue in the multiple docking adapter, pull it into the tunnel as the last crewman enters the command module, and close the multiple docking adapter hatch with the lanyard before installing the probe and drogue. Lanyard is to be used to close that hatch. The hatch is locked by reaching around the edge of the drogue. We don't know at this time which of the crewmen will do that job, but that'll be the one with the longest reach, and we're not certain which one will be given that responsibility, but he will remain unsuited, unlike the other two. This is Skylab Control. We'll remain live for air-to-ground from Madrid. We're approaching AOS.

END OF TAPE

SL-II MC-1333/1

Time: 21:40 CDT 29:02:40 GMT

6/21/73

PAO - possibility that he will remain unsuited, unlike the other two. This is Skylab Control. We'll remain live for air to ground from Madrid. We're approaching AOS there now. Skylab Control at 40 minutes after, remaining live for air to ground.

CC Skylab, Houston. Through Madrid for 7 minutes.

CC Skylab, Houston. Six minutes through Madrid.

CDR Roger.

CC Skylab, Houston. We're about 30 seconds from LOS. Carnarvon is coming up at 19. You're looking good going over the hill.

CDR Roger.

PAO Skylab Control at 2 hours 49 minutes and 25 seconds Greenwich mean time. We have lost signal at the Madrid tracking station. Expect to acquire Carnarvon in approximately 38 minutes. To clarify anything that was misunderstood on that last pass. The teleprinter pad sent up to the crew is an optional procedure not likely to be used unless there is difficulty. These are interim undocking procedures. Assuming the probe cannot be locked in drogue normally. A summary again of that is, in the event that the probe and drogue do not connect properly as was the case during some difficulty we had in the original docking with the workshop following the fly-around, when the crew first arrived at the space station. Assuming that probe and drogue do not interlock properly, this is a point for fitting into an opening in the drogue. If that probe does not lock normally in the drogue it will require the crewman with the longest reach, presumably Joe Kerwin, to remain unsuited until after the tunnel closeout, that is the closeout of the tunnel between the MDA and the command module. At that point, his job will be to mate the probe and the drogue in the MDA, to take the hardware back into the MDA, and to do it by hand, rather than automatically. And then pull it into the tunnel between the MDA and the command module. This is a procedure that was just sent up over the United States during this last pass. The procedure is one that's probably not going to be likely. They have tried the probe and drogue operation inside the space station after that difficulty with undocking and believe they have got it operating properly. Ten times they tried it and it succeeded each time, but it is a possibility that it will again cause them some difficulty. This is a procedure sent up to take care of that difficulty. In that event, the last crewman would enter the command module.

SL-11 MC-1335/2

Time: 21:40 CDT 29:02:40 GMT

6/21/73

close the MDA hatch using a 10 foot long rope, and install the probe and drogue by hand and lock the hatch by reaching around the edge of the drogue in that command module tunnel. So this is a interim undocking procedure sent up in the event that they do have some difficulty with the probe and drogue interlock as they did have at the time of the beginning of the Skylab mission. This is Skylab Control. Our next acquisition of signal 36 minutes from now at Carnarvon station. This is Skylab Control, 51 minutes 45 seconds after the hour.

END OF TAPE

SL-11 KC-1336/1

Time: 22:16 CDT, 29:03:16 GMT

6/21/73

PAO Skylab Control at 3 hours, 17 minutes, and 10 seconds Greenwich Mean Time. We are now approaching acquisition of signal at Carnarvon - Carnarvon in Australia and expect to have that acquisition in about a minute and 45 seconds. We will remain live for air-to-ground from Carnarvon.

CC Skylab, Houston. We got a low elevation pass, a couple of minutes through Carnarvon.

CDR Okay, Hank. I did the P52 a little early. Let me give you the data.

CC Okay, go ahead.

CDR Okay. Star 40 and star 45, 5 balls, plus 00015, minus 00031, minus 00013 and the GMT, I guess, off - now 65 was 03, 02, 0000, which I guess is 0702. It's phoney time.

CC Roger. We copy.

SPT And Houston, SPT. Now that we've finished with the star tracker, may I configure the ATM for quiescent.

CC I'll see SPT.

SPT Okay. You guys check up on me.

SPT Where's your next RAD, Hank?

CC Say again.

SPT Where's the next main contact.

CC Okay. We'll drop out here for just a minute or so. We'll come up on Honeysuckle at 28 for a couple of minutes.

PAO Skylab Control at 3 hours, 22 minutes, and 22 seconds Greenwich Mean Time. We have now lost signal at Carnarvon and don't expect to acquire again for another 4 minutes when we will be acquired by our other Australian tracking station at Honeysuckle. This is Skylab Control at 22 minutes and 40 seconds after the hour.

END OF TAPE

SL-II MC-1317/1

Time: 22:24 CDT 29:03:24 GMT

6/21/73

PAO Skylab Control at 3 hours 24 minutes and 53 seconds Greenwich mean time. We are now approaching the Honeysuckle tracking station's area of coverage and we will stay live for air-to-ground from Honeysuckle. We are approximately 1 minute and a half before we expect acquisition at Honeysuckle.

CC Skylab, Houston through Honeysuckle for about 1 minute and a half.

CC Skylab, Houston. About 1 minute until LOS. We'll be coming up on Goldstone at 57.

PAO Skylab Control at 3 hours 29 minutes and 51 seconds Greenwich mean time. We have now lost signal at Honeysuckle and expect to acquire again in 26 minutes and 53 seconds at Goldstone in California. That will be our next acquisition of signal 26 minutes and 45 seconds from now. It's now 30 minutes after the hour. This is Skylab Control.

END OF TAPE

Time: 2103:54 GMT, 2103:54 GMT
6/21/73

PAO Skylab Control at 3 hours 54 minutes and 54 seconds Greenwich mean time. We are now 1 minute and 54 seconds from acquisition of signal at Goldstone tracking station in California. This is an extended United States pass, tracking across all three of the continental antennas, one at Goldstone, one at Corpus Christi, Texas and the other at Merritt Island, Florida. And we will remain live for air-to-ground from the United States tracking stations.

CC Skylab, Houston; stateside for about 16 minutes.

CDR Roger. Do you want POG and ACCEPT?

CC Roger. You can go ahead and give it to us. It'll be about 4 more minutes over Texas when we uplink the clock sync.

CDR Okay, that's going to be PET, right?

CC That's affirmative.

CDR Hooray, I got it right.

CDR You've got POG and ACCEPT now.

CC Okay, sir. And for info, the electrical system looked real good going over the hill there at Honey-suckle, and we've checked out the E-mod and it's okay.

CDR And I'll tell you we're on page S5-8 in that command module systems checklist doing the pie-docking switch first look at the panels checks.

CC Roger, and can we get an update on the SPT and PLT?

PLT Yes, the PLT has just configured - just finished configuring the SPS circuit breaker and how about if you guys verify your command capability?

CC Wilco.

CDR And the SPT is helping me, because he's up to where he should be.

PLT And did you verify ATM command capability, Houston?

CC Negative, sir. Now that you are through, we're going to give it a go.

PLT Okay.

PLT And Henry, what I have not done yet, but I have had it at the appropriate places on back out at the workshop is the heat exchanger fan, OWS heat exchanger fans are still running. I've added the switches to my checklist further down, and I've added the circuit breakers to my checklist further down.

CC Roger. Copy.

CC CDR, Houston. We noticed you got a C&W there. Was that - did you enable S Bravo?

CDR Yes, if you remember, both of them are bad.

SL-11 MC-1338/2

Time: 22:54 CDT, 29:03:54 GMT

6/21/73

Alfa and Bravo are bad. I think quad A and quad B are bad.
Quad B OFF/SCALE HIGH 300 and we got both of those shut off.

CC Roger, copy.

CC CDR, the PT's in, the computer's yours.

CDR Thank you, sir.

CDR All right, Houston, are you still there?

CC Roger. Go ahead.

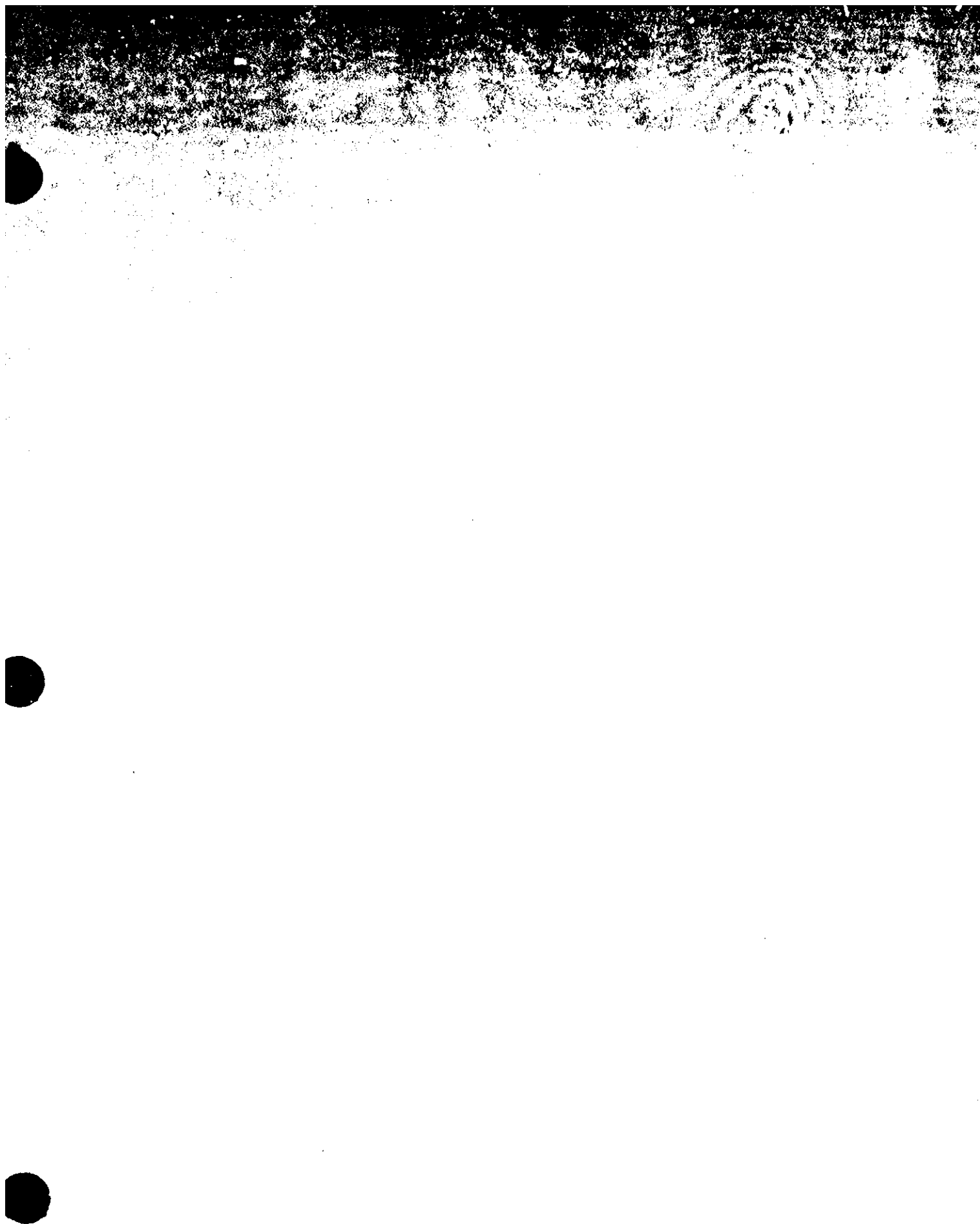
CDR I think in this one on page S5-10 panel

377 - I think you want the GLYCOL to RAD SEC valve
to FLOW instead of BYPASS per the new procedure, right?

CC Stand by 1 on that, Pete.

PLT Houston, how about either turning the TV
on or let us hit COMMAND RECESS, please.

END OF TAPE



SC-11 MC-1339/1

Time: 23:04 CDT, 29:04:04 GMT

6/21/73

CC

Go ahead and hit command reset.

CC

CDR, Houston. I think that in page 2-42 there of the checklist, we don't do page 5-10 in the CSM Systems Checklist at this time. We catch that a little later down the line, and there we'll configure that system properly.

CDR

That's not what it says in my book - wait, hold it.

CDR

It says - in my book on page 2-42, it says "F5-7, 8, 9, and 11, except panels 4, 230, 201, 98, 12, and 351." You don't want to do page 10, is that what you're telling me?

CC

Roger. Page 10 wasn't in that list.

On page 2 - 2-38 your copy - -

CDR

- - it says "Start on F5-1 and configure all panels on F5, 7, 8, 9, and 11 except panels 4, 230, 201, 98, 12, and 351 which are on those pages. (garbled) you should do.

CC

I've got affirmative and the steps that on 510 were accomplished on page 2-38, and we did have a change in there where we went to normal.

CDR

That's right. I've already done it. Just wanted to confirm it.

CC

You're correct.

CC

Skylab, Houston. We've been watching the primary refrigeration loop here pretty closely, and it doesn't seem to be performing properly. In fact, the whole loop seems to be slowly warming up. I wonder if somebody could run down and check panel 611 and check that all the circuit breakers are closed.

SPT

I did that twice; I'll do it again.

CDR

Hey, Houston. I'm getting ready to terminate the O2 purge here a little while, okay?

CC

Roger.

CDR

Thank you.

SPT

Houston, all the circuit breakers on 611 are closed.

CC

Roger. We copy.

CC

And, SPT, for you info, all the ATM command checks were good.

SPT

Roger. Thank you.

CC

Skylab, Houston. We're about 1 minute to LOS. Madrid at 18, with a recorder dump, and CDR, you can go to block.

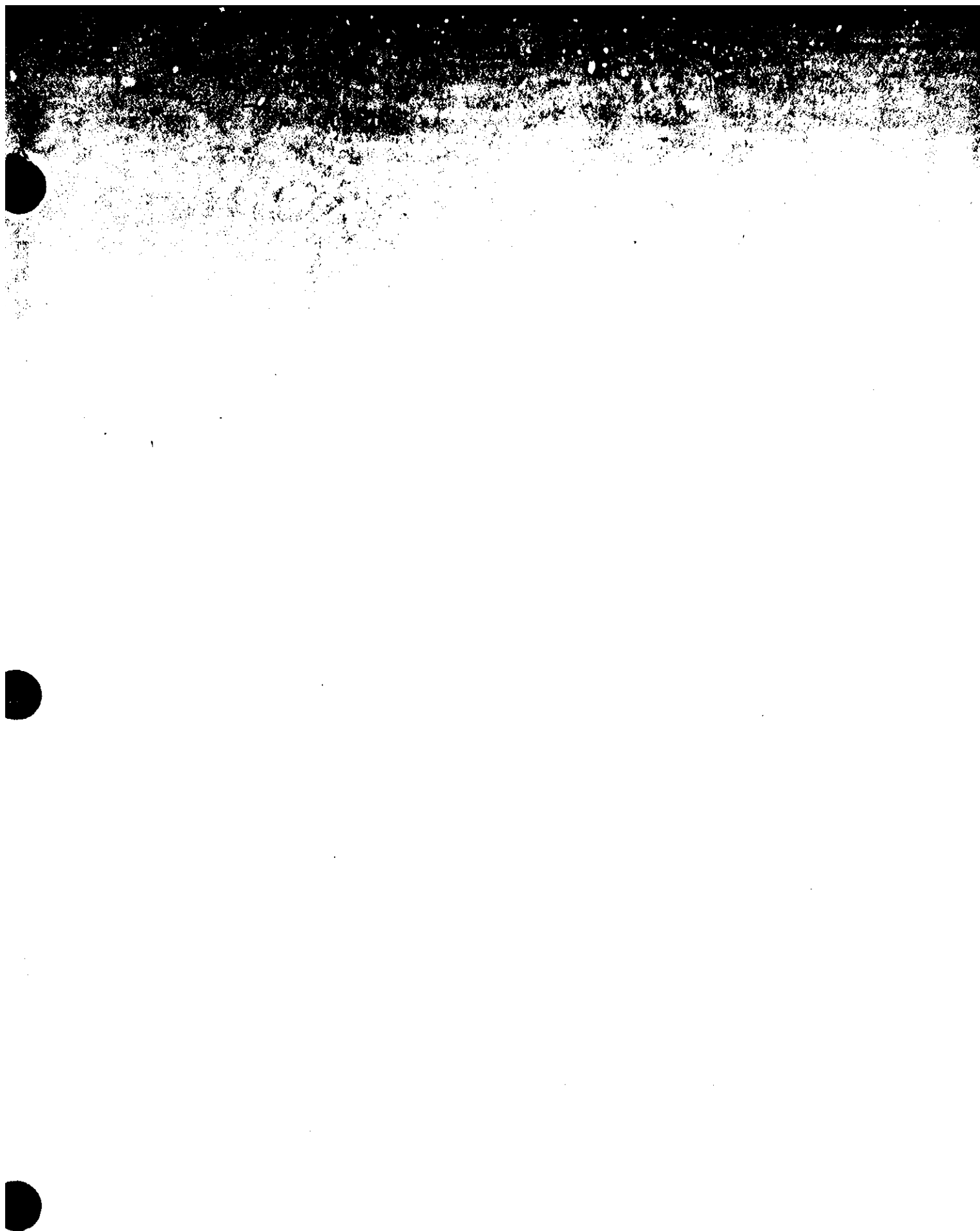
PAO

Skylab Control at 4 hours, 14 minutes, and 9 seconds Greenwich mean time. We have lost signal at Bermuda tracking station, and expect to acquire again in about 4 minutes at Madrid. During this last pass, the crew was informed that we had discovered a problem with primary coolant loop in the orbital workshop; this is

SC-11 NC-1339/2
Time: 23:04 CDR, 23:04:04, GMT
6/21/73

not the same cooling system that operates the airlock module and the telemetry equipment. Both the coolant loops and the airlock module had given us some trouble with sticking temperature control valves earlier. This is a separate system - system that feeds the food freezers, wardroom freezers, water and urine chillers in the orbital workshop. At this time, it appears the temperature on that orbital workshop primary refrigeration loop or coolant loop had moved up several degrees. Food freezers are still well within the safe range, but should those temperatures continue to come up as they have been, approximately 5 degrees, moving up from about temperatures ranging around 7 or 8 degrees below zero Fahrenheit to 0 to 5 degrees below zero Fahrenheit. If those temperature do continue to come up, the secondary coolant loop in the orbital workshop will come on line, and the primary one will be shut down automatically by a computer system that does handle that problem. But there is some concern here that there may be a problem; that the crew may have by accident made a mistake in the configuration of controls for the - the coolant loop. So that was the reason that they requested a member of the crew go back down to make a check of that and find out for certain that all control are set the way they were instructed to set them. That's a very - very small problem, but it's one they would like to remedy before they crew departs. Indication from Commander Conrad was that they are moving along very well, approximately half an hour ahead of the time line at the beginning of this pass. All three of the crew members were in the command module during the pass, and one of them was instructed to go back to the orbital workshop at the other end of the space station to check out that refrigeration loop. This is Skylab Control; we will remain live for air-to-ground from Madrid in approximately 1 minute and 45 seconds. This is Skylab Control remaining live for air-to-ground.

END OF TAPE



Skylab 4-11-73
Time: 04:11 EDT 10:04:10 GMT
5/21/73

CC Skylab, Houston through Madrid 9 minutes.
CDR Roger, Hank. We checked all the freezer doors and that. Everything's latched up secure. The only thing that's different is the SPT has taken out all that frozen urine, and he put some warm hardware in there. But it was just the empty drains and that (garble) wasn't much.

CC Roger. That doesn't seem to be the problem. We're a little puzzled about the thing. Our telemetry seems normal. The valves and everything in the right places, however the loop seems to be warming up.

PLT Okay, I also got a question for you on the configuration of the breakers on panel 613. Regarding the SAL power. All the SAL outlet breakers are open except plus 2 outlet 1. Is that really what we want?

CC Okay. That was one of the changes we uplinked Paul, the configuration there should be all those experiment circuit breakers open except BUS 2, SAL OUTLET 2 minus 2.

PLT Okay, we didn't get it. It didn't show up in the book. I'll change it. You want the one S149 plugged into, right?

CC Say again.

PLT I figured you want the one that S149 is plugged into.

CC That's affirmative.

CDR Hey, Houston, you still there?

CC Roger, for about 3 more minutes.

CDR Well, when we got the television in the rendezvous window, and you can command it on anytime you want to get a check on it. See if you like that new lens. We changed lens.

CC Roger. Our telemetry looked good and for the PLT, we've got your reg adjust settings for you.

PLT What reg adjust settings? I was just marveling at how EGIL figured it all out so it came out exactly right when we unhooked the CSM.

CC I think this is - he's got a failure here and he wants you to adjust BUS 2 clockwise to increase the PCG total 2 by 5 amps.

PLT Okay.

PLT How's that look?

CC Okay. It looks good to us.

PLT Okay.

CC Skylab, Houston, about 30 seconds from LOS, Honeyuckle at 04.

PAO Skylab Control at 4 hours 28 minutes and 26 seconds Greenwich mean time. We have lost signal

SL-11 NC-1340-2
Time: 23:16 CDT 29:04:16 GMT
6/21/73

at the Madrid tracking station, and are now out of range of signal for 35 minutes and 43 seconds. During the last pass we did have some problem with the refrigeration primary coolant loop and they are still looking into that here at Mission Control. Flight Controllers believe that it may still be a switch problem rather than anything actually wrong with the line. Temperatures remain very - very well within a safe range, most of the food freezers still around zero degrees, the lowest of them being about 5 degrees below zero Fahrenheit. The refrigeration system is set for a freezer range no higher than minus 10 - I'm sorry, no higher than plus 10 degrees Fahrenheit for long term food storage. That means that they still have a range of about 10 degrees higher to go and should the temperature continue a trend up towards that 10 degree upper limit for temperature on the freezers, the secondary coolant loop would be automatically activated by the control panel of the refrigeration system. This is Skylab Control at 29 minutes and 36 seconds after the hour.

END OF TAPE

LOOP SWITCHED TO SECONDARY MONITER

SC-11 MC-1342/1

Time: 00:16 CDT, 290516 GMT
6/21/73

FAO The TV period is expected to last about 16 minutes, beginning at about 03:32 a.m. central daylight time. And concluding as the command module passing out of range at 04:07:52 a.m. central daylight time. Following the flyaround, the command module will fire its small reaction control system engines for 23 seconds at 04:40 a.m. central daylight time, and begin moving slowly away from the space station. The astronauts will slow the'r craft 5 feet per second or about 3 miles per hour, dropping behind the Skylab cluster as they fall into a lower orbit. The maneuver, called separation, begins over the Indian Ocean 2,000 miles south of Madagascar at the nearest point to the Antarctic Continent. The lower orbit will also be a shorter orbit, so the slower-moving command module will pass beneath the space station and move ahead of it. Following separation at 5:05:30 a.m. central daylight time, Friday morning, the main engine, or service propulsion system, will be fired for 10 seconds as the command module flies backward. The brief firing of the powerful SPS engine slows the spacecraft another 264 feet per second, or about 180 miles per hour, driving it out of it's nearly circular orbit and into an orbit about 269 miles at its high point, and 104 statute miles at the low point. The orbit shaping maneuver is conducted over the Philippine Sea 600 miles east of Mindanao. The final burn, a 7-second firing of the main engine, slows the command module another 190 feet per second, or 130 miles per hour. This retrofire maneuver is conducted at approximately 8:10:43 a.m. central daylight time over Southeast Asia. The retrofire maneuver guides the phase elapsed time clock, or the PET clock, which is now used to conduct these final activities. Because retrofire calculations change constantly, the PET clock, called the phoney clock by an astronaut earlier tonight, is set and reset to conduct - to conduct retrofire at exactly 20 hours on the PET clock. With other events - in the sequence time to both the phase elapsed time clock and the Greenwich mean time clock used during most of the Skylab mission. The spacecraft - spacecraft begins dropping in towards the atmosphere following retrofire, and reaches 400,000 feet altitude at about 36 minutes after 8:00 a.m. central daylight time. Splashdown is scheduled for 8:50 a.m. central daylight time this morning some 830 miles southwest of San Diego, California. The predicted impact point is 24 degrees 46 minutes north latitude, and 127 degrees 4 minutes west longitude. This is Skylab Control at 19 minutes and 5 seconds after the hour. Our next acquisition of signal 5-1/2 minutes from now at Hawaii. This is Skylab Control at 19 minutes after the hour.

END OF TAPE

SL-11 MC-1343/1

Time: 00:22 CDT 29:03:22 GMT
6/22/73

PAO Skylab Control at 5 hours 22 minutes and 59 seconds Greenwich mean time. We are approaching acquisition of signal at Hawaii in approximately 1 minute and 50 seconds. During this pass we should get some additional data on the temperature changes on the secondary coolant loop, which did not appear to be having a particularly beneficial effect at Honeysuckle. They are going to take a look at that and see whether or not they want to go back to the primary loop during this pass. So we'll stay live for air-to-ground from the Hawaii Islands tracking station. This is Skylab Control at 23 minutes 29 seconds after the hour staying live for air-to-ground.

CC Skylab, Houston through Hawaii for 7 minutes. And we have switched back to the primary loop on the refrigeration system.

PLT Roger. How does it look?

CC It doesn't look good to us right now. We're still smoking it over.

CDR Secondary loop look good?

CC Negative. It didn't look good either.

SC Holy Christmas.

SPT Was it something we did during closeout that's not obvious?

CC Not that we can tell. We're thinking of the possibility now that we may have a radiator frozen up.

CC We're in this high Beta now. We're in a situation where the radiators are meeting their coldest temperatures. They're pointed away from the Sun all the time and no albedo from the Earth on them.

CDR Hank, we have (garble)

CC Roger. Copy.

CC And for the PLT, the command checks all turned out good, the AM command checks, and for the CDR, stars 37 and 42 are still good.

PLT Hank, the PLT is holding at the top of page 67.

CC Rog. Copy.

CC PLT, are you down in the experiment area?

PLT No sir. I'm out of the workshop and all lights are out and I'm in the MDA. I can go back down if you want.

PLT What do you need, Hank?

CC Okay, we're just discussing here now, Paul, we decided - we were going to have you switch over to pump 2 on primary loop, but we decided we're going to leave it on pump 1.

PLT Okay.

SI-II MC-1343/2

Time: 00:22 CDT 29:05:22 GMT

6/21/73

CC Skylab, Houston. One minute to LOS.

Goldstone at 33.

CDR Okay, well, we're going off the comm here
for a minute. We're pulling the umbilical.

PAO Skylab Control at 5 hours 32 minutes
and 37 seconds Greenwich mean time. We have temporarily
lost signal as we pass out of the range of the Hawaiian
Islands tracking station, but expect to acquire
again at Goldstone in California in approximately 23
seconds. We will remain live for air-to-ground and a
call from the spacecraft communicator, Henry Hartsfield.

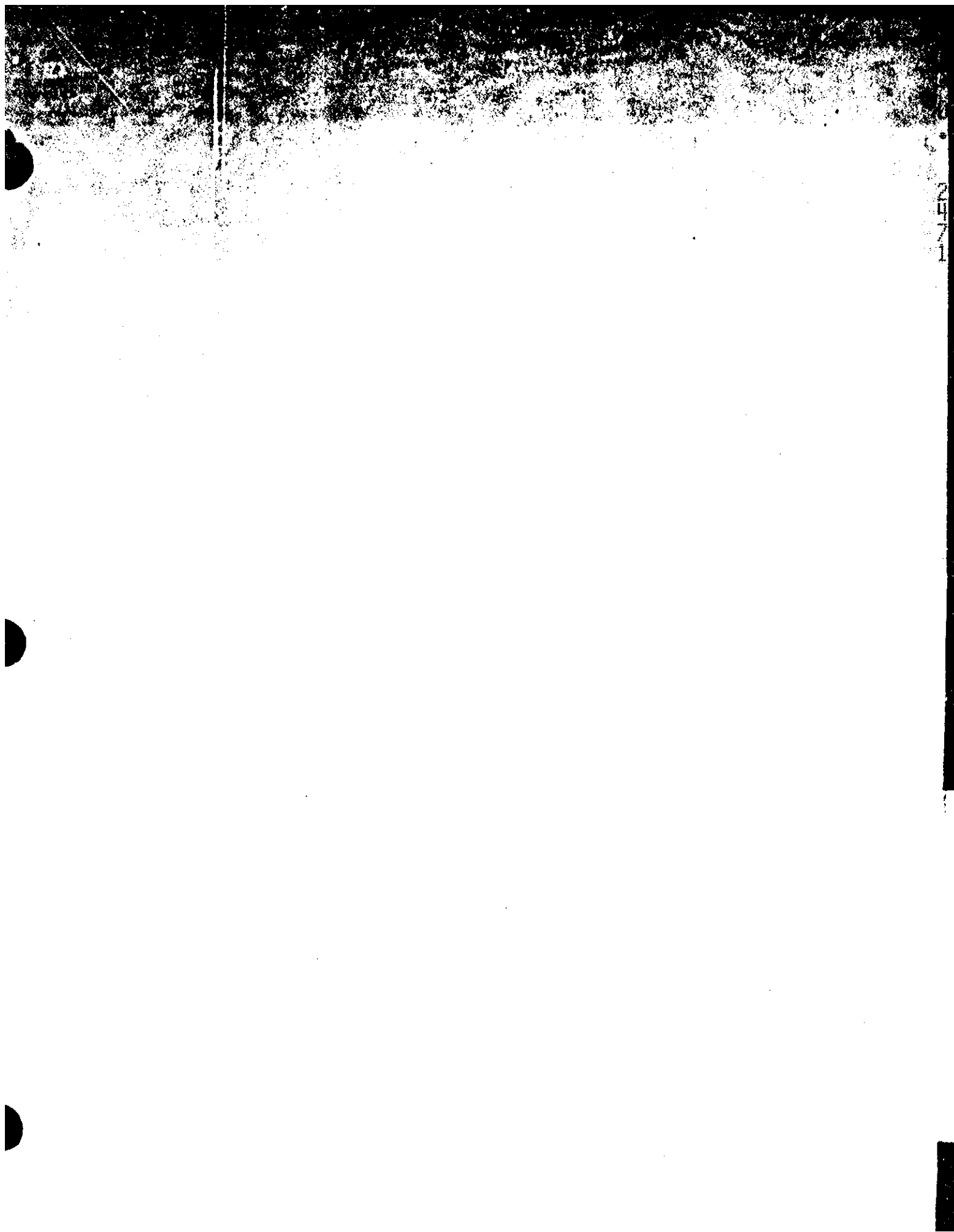
END OF TAPE

SL-1F NC-1304/2

Time: 00:32 CDT, 19:05:32 GMT
6/22/73

from down here. We do expect that probably at the Canary Islands station or possibly shortly thereafter, we may do an maneuver - 45-degree pitch maneuver, using either the orbital workshop's - the Skylab workshop's TACs gas, that's thruster attitude control system gas, or using - possibly using the command module's engines. Right now, that hasn't been decided and that's still being considered here at Mission Control; they are doing a plan for that attitude control maneuver. It will take some time to get exact data for the maneuver. This is Skylab Control. We will remain live for air-to-ground from Bermuda in approximately 1 minute.

END OF TAPE



SE-12 NC-1545/1
Time: 00:45 CDT 29:05:43 GMT
6/22/73

CC
6 minutes.

Skylab, Houston through Bermuda for

CDR

Roger.

CC

Skylab, Houston. We're having a little trouble selecting antennas from the ground. Could you give us command reset?

CDR

Want it left there or you want it

back in normal?

CC

Roger. We'd like to go back to normal. We'll do that.

CDR

CC

Skylab, Houston. We're still having trouble with the antennas. Could you tell us the position of your two S-band antenna switches?

CDR

Okay. They're in op EC and (garble)

CC

Roger. We copy.

CDR

I'm still in the process; I just finished reconfiguring the comm. That may have been part of your problem. S-BAND POWER AMP PHASE MODULATOR X-PONDER 2 FLIGHT BUS breaker was open for awhile. I just closed it again.

CC

Roger. Copy.

CC

Skylab, Houston; 1 minute to LOS. Canaries at 45.

PAO

Skylab Control at 5 hours 53 minutes and 12 seconds Greenwich mean time. We have lost signal at our Bermuda tracking station. About to pick up signal again in 2 minutes at our Canary Island tracking station. We will remain live for air-to-ground at Canary Islands. They're still considering the attitude maneuver. They have checked with the medical people to determine the effect on the food in the freezers at higher temperatures. The medical people indicated that a 10-degree temperature for a 24 hour period would have no adverse effect on the foods. And for that reason they may decide to postpone this attitude maneuver until after the command module has departed from the orbital workshop. That attitude maneuver can, of course, be performed from here at Mission Control. So we still are indefinite about whether the attitude maneuver will or will not be performed. Flight Director Neil Hutchinson indicated that he would prefer not using the command module to perform the maneuver, but of course, it could still be performed by the command module. We are 1 minute from acquisition of signal at Canary Islands, and we will stay live for air-to-ground from Canary.

END OF TAPE

2472

2473

SL-11 MC-1346/2

Time: 00:54 CDT, 29:05:34 GMT

6/22/73

CC
9-1/2 minutes.

Skylab, Houston through Canary for

SC

Roger, Houston. How do you read?

CC

Roger. Reading you loud and clear.

SC

Okay.

CC

Skylab, Houston. We're pretty much convinced now that we're going to have to do a maneuver to put that radiator in the Sun and we're still looking at the possibility of doing it with a CSM. The reason we - we can't get a handle on the TACS usage and of course you know the TACS is critical for us and well, we're still debating whether to do it with a SWS or the CSM and we should have a decision on that by Carnarvon.

SC

Well, don't ask me to do it in the next little bit, man, we got tunnel, drogue, probe, suits, junk. I can't even move in here right now. You can forget us for at least an hour 'til we get this command module straightened out. For us to maneuver, you couldn't ask for a worse time.

CC

Roger. We're taking that into account, Pete, and we'll be switching over to PET now, all times are being PET and Honeysuckle will be coming up at 30 PET. I'll be handing over to Richard now. Keep it in the groove, and we'll see you in Houston in a couple of days.

CDR

Roger.

CC

So long.

CDR

Thank you for everything, Hank.

CC

Okay. See you guys later.

END OF TAPE

2475

SC-11 NC-1347/1

Time: 01:05 CDT, 29:06:00 GMT
6/22/79

PAO

Skylab Control, I have 6 hours, 6 minutes Greenwich mean time. We have lost signal now over the Canary Islands tracking station. Do not expect to acquire again for 34 minutes and 13 seconds at which time we'll acquire at Honeysuckle, Australia. Long period of LOS as the spacecraft travels to the southeast across Africa. During this last few moments of Canary Island pass, spacecraft communicator Henry Hartfield talking to commander of the Skylab Mission Charles Pete Conrad indicated that we are now still considering that attitude control system, do believe it will be a attitude control maneuver. We do believe that it will be necessary to do some sort of a maneuver to put the radiator end of the orbital workshop in the Sun, or at least shine some light on it for some period of time probably for 1/2 to 1 revolution above the Earth or approximately 45 minutes to 1 hour and a half. At this time, it's not been determined whether that should be done before or after undocking and also it's not be determined whether it will be done by the command module engines or by the TACS gas equipment, that's the thruster attitude control system gas that's used on the Skylab workshop for maneuvering. One of the concerns here, is consumption of TACS gas, thruster attitude control system gas was used quite heavily in the earlier parts of the mission because thermal control problem. We still do have a more than sufficient supply, approximately half again of what will be required for the completion of the Skylab missions but because we began with roughly double what was required for the Skylab missions, there is some concern that we're using too much TACS and we would like to conserve as much as possible in case of future difficulties. Because of that, it may be that Commander Conrad will be asked to do the maneuver using the command module engines. A maneuver under consideration right now is a 45 degree pitch down, which is to say the nose of the spacecraft - forward end of the spacecraft will be pitched down maneuvering that rear end of spacecraft up into the Sun a little more. Spacecraft remains in sunlight now, all the time, because of what are called high beta angles, that is to say, the angle of the orbit of the spacecraft is such that the Sun is always in line of sight of the spacecraft and it never passes beneath - behind the Earth and out of sight of the Sun. That began at 11:00 a.m. central daylight time on Thursday and continue for about 4 days. Has the advantage of providing electrical launchers - electrical energy to the spacecraft, higher levels than we normally would experience. Normally we spend approximately

SC-11 NC-1347/1

Time: 01:05 CDT, 29:06:06 GMT

6/22/73

PAO Skylab Control, I have 6 hours, 6 minutes Greenwich mean time. We have lost signal now over the Canary Islands tracking station. Do not expect to acquire again for 34 minutes and 13 seconds at which time we'll acquire at Honeysuckle, Australia. Long period of LOS as the spacecraft travels to the southeast across Africa. During this last few moments of Canary Island pass, spacecraft communicator Henry Hartfield talking to commander of the Skylab Mission Charles Pete Conrad indicated that we are now still considering that attitude control system, do believe it will be a attitude control maneuver. We do believe that it will be necessary to do some sort of a maneuver to put the radiator end of the orbital workshop in the Sun, or at least shine some light on it for some period of time probably for 1/2 to 1 revolution above the Earth or approximately 45 minutes to 1 hour and a half. At this time, it's not been determined whether that should be done before or after undocking and also it's not be determined whether it will be done by the command module engines or by the TACS gas equipment, that's the thruster attitude control system gas that's used on the Skylab workshop for maneuvering. One of the concerns here, is consumption of TACS gas, thruster attitude control system gas was used quite heavily in the earlier parts of the mission because thermal control problem. We still do have a more than sufficient supply, approximately half again of what will be required for the completion of the Skylab missions but because we began with roughly double what was required for the Skylab missions, there is some concern that we're using too much TACS and we would like to conserve as much as possible in case of future difficulties. Because of that, it may be that Commander Conrad will be asked to do the maneuver using the command module engines. A maneuver under consideration right now is a 45 degree pitch down, which is to say the nose of the spacecraft - forward end of the spacecraft will be pitched down maneuvering that rear end of spacecraft up into the Sun a little more. Spacecraft remains in sunlight now, all the time, because of what are called high beta angles, that is to say, the angle of the orbit of the spacecraft is such that the Sun is always in line of sight of the spacecraft and it never passes beneath - behind the Earth and out of sight of the Sun. That began at 11:00 a.m. central daylight time on Thursday and continue for about 4 days. Has the advantage of providing electrical launchers - electrical energy to the spacecraft, higher levels than we normally would experience. Normally we spend approximately

SC-11/10-10/1
Time: 01:05 CDT, 23:06:06 GMT
6/22/73

70 percent of the period of revolution in the Sun, and about 30 percent in darkness, that varies because of the precession of both the Earth's axis and precession of the orbit of the spacecraft. So there is - they are not considering the possibility of doing that command module maneuver, to maneuver the entire 100 ton spacecraft in order to point those radiators at the Sun in event the coolant in the radiator is frozen at one point. That's of course, nothing we know for certain at this point. All we do know is the temperature have moved up over the past several hours and the food freezer area and on the primary coolant loop of the orbital workshop. This is to remind you again, this is a distinct coolant loop from the coolant loop in the airlock modules, those coolant loops are used primarily for telemetry systems and for the ATM control and display panel had given us a good deal of trouble earlier primarily because of the stuck valve, stuck temperature control valve in both the primary and the secondary loop. Those airlock module loops are working fairly close to properly, primary loop is now working at proper temperature in the airlock module, the secondary loop is still reading about 1 degree cooler than it is desired. There is some concern that that is not working as desired it should work, it's reading 1 degree lower and appears that the temperature control valve may be stuck 1 degree lower level than desired. Certainly no problem or concern. This OWS primary refrigeration loop the primary refrigeration loop in the workshop which serves the wardroom freezer, urine freezer and food freezer as well as the water chiller and a number of urine chillers, is reading higher temperatures than we normally had experienced. Only 1 of them has reached the upper limit for long term duration mission; that is the urine freezer which is now reading 10.5 degrees. That's well above the desired limit - desired limit and this is a correction - desired limit on the urine freezer is plus 2 degrees rather than plus 10 degrees. Plus 2 degrees is the urine freezers maximum normal temperature reading. The freezer are allowed to read as high as plus 10 degrees. Only the urine freezer has gone up above this desired level. The others are reading in the 5 to 7 degree range, so they are still in the safe levels and not posing any great problems. Medical personnel in the food and nutritional areas were asked what effect the long period of time at 10 degrees might have on the - on the food in those freezers and they did indicate that they would have no effect on the quality of the food at all, that they could go on at a temperature several degrees higher than they are now reading without any difficulty. However, the plus 10 temperature - well, the plus 10 temperature in the freezers would have no adverse effect on the quality of frozen foods, even over extended periods of time. Two experiments -

2478

SC-II MC-1347/3

Time: 01:05 CDT, 19:06:06 GMT

6/22/73

the data from two medical experiments, MO71 and MO73, which require very precise measurement of gains and losses in water, calcium, nitrogen, and other biochemical constituents during space flights, might be slightly degraded by above normal temperatures and the indication is that plus 10 temperature in the freezer for period of 24 hours might degrade the data from - those two experiments about 1 percent, which means there would be slightly greater error in the data for two of the medical experiments. Very, very slight change even if it should go for 24 hours it now appears that in the next few hours we'll do a maneuver to attempt to warm up those radiators. That again, to repeat, it would not have any effect, even if the temperature was several degrees higher for a long period of time, it would have no effect on the quality of the food in the frozen food freezer in the orbital workshop. This is Skylab Control; our next acquisition of signal 27 minutes and 46 seconds from now. This is Skylab Control at 12 minutes and 40 seconds after the hour.

END OF TAPE

THESE ARE THE VARIOUS OF THE ABOVE DISCUSSED.

1540/1
TIME: 01:31 CDT 29:06:31 GMT
6/22/73

PAO Skylab Control at 6 hours 32 minutes and 4 seconds Greenwich mean time, or 13 hours 21 minutes and 21 seconds phase elapsed time. We are now still 8 minutes from acquisition of signal at the Moneysuckle tracking station in Australia. Here is some update information on the problem on that orbital workshop refrigeration system. The urine freezer, which is now reading about 8 degrees higher, as of the last telemetry data, reading about 8 degrees higher than its planned maximum of plus 2 degrees Fahrenheit, is not in use at this time and will not be required until the beginning of the next manned mission more than a month from now. It was used to store urine for experimental purposes during the mission, but that urine has now been transferred to the command module area and where it's kept in an insulated box. Only one temperature sensor is located in the radiator area of the orbital workshop, where it's believed that there may be a blockage in the flow of coolant to the refrigeration system that serves the food freezers, wardroom freezers, urine freezers, urine chillers, and water chillers in the orbital workshop living area. There is only a single temperature sensor there. That sensor indicates a temperature about 65 degrees above what is called the poor point of coolanol. Coolanol is not a crystalline substance. Doesn't freeze in the same way that water freezes to ice, but it does become a very heavy slushy liquid at about 160 degrees below zero Fahrenheit. That's minus 160 Fahrenheit. The sensor now reads a minus 195 as of the last station, which is still well above the poor point, but would have an effect on reducing the flow of the coolanol. For this reason they are presently here in Mission Control - Flight Director Neil Hutchinson and his team of flight controllers are considering maneuver possibilities to adjust the attitude of the spacecraft, pitching it down 45 degrees to point the radiator toward the Sun and warm the temperature up a bit there. Flight Director Hutchinson indicated that he would prefer to do the maneuver with the orbital workshop's, or with the space station's own TACS system, that's the thruster attitude control system, but at this time, it would be very difficult to generate the amount of data needed on the present attitude control system, the control moment gyros and the associated hardware to make an exact calculation of the thruster attitude control system gas required for that maneuver. Because of this, and because of the desire to control TACS gas, it is quite possible that they may ask Commander Conrad to do the maneuver using the command module engines. At the last pass the

2481

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2482

SL-11 MC-13437
Time: 01:37 CDT, 29:09:11 GMT
6/22/73

CC Skylab, Houston. We're AOS Honeysuckle for 9 minutes.

CDR Hi, there. We'll all pressurized doing out suit integrity checks.

CC Roger. Understand, Pete. And we're prepared down here to - we're going to have a quick look at these refrigeration temperatures. We're prepared to command the maneuver here at Honeysuckle - to maneuver the SWS to an attitude about 45 degrees to the Sun. And our big plan is, Pete, is - depending on the temperature response we get when we get to this attitude, we're going to stay here about - at least half a rev. And depending on the temperature response after that half rev, we're going to decide whether to maneuver back, and then have you conduct the planned flyaround. Or, if it's not responding, or we need to stay there for a full rev, we may go ahead and stay in this odd-ball attitude for the full rev and modify the fly-around as necessary to save the refrigeration loop.

CDR Okay.

CC And the maneuver will be - I have the angles on the ball that you'll see at the end of this maneuver. And it's going to be about a 10-minute maneuver time, and I'll let you know when we command it.

CDR Okay, well, nobody can write anything down right at the moment.

CC Okay, no problem. When - if you want them, and when you do, I've got them.

CDR And the good SPT wants you to be reminded that he put undocked gains in the ATM DC.

CC Roger. We know that. Thank you much for the reminder.

CDR Okay. Just trying to keep you honest like you keep us honest.

CC Yes sir, and thank you.

PLT Say, Richard, you got time for a stowage change?

CC Affirmative. Go ahead.

PLT Okay, on close-out, I was supposed to put the closeout camera - the Nikon in M151, I think. Wasn't really room for it in there. It is now stowed in M158.

CC Okay, I got that. Thank you, Paul.

CC Skylab, Houston. Be advised with the maneuvers in work, and we've commanded it to start.

CDR Okay. Why don't you tell me the gimbal angles?

CC Okay. Roll 276, pitch 312, yaw 311. And there may be a very slight variation in that due to a slight uncertainty in use of Z.

SL-11 MC-1349/2

Time: 01:37 CDT, 1970 09:37 GMT

6/22/73

CDR Okay. And we're releasing docking latches
at the time.

CC

Roger.

CC

And also, Skylab; Houston. We've still
got 5 minutes here at Honeysuckle. Anytime you get a chance
here at Honeysuckle, or at Hawaii we're - I'm ready to copy
the P52 data.

CDR

Coming at you. 37 44 4 balls 1 plus 00120
minus 00218 minus 00101. The time 13:13 35:00 Peter, Echo,
Tango time.

CC

Roger. Got it, Pete. Thank you much.

END OF TAPE

SL-11 NO-1350/1
Time: 01:07 CDT, 29:06:47 GMT
6/22/73

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2405

CC Skylab, Houston. We're about 1 minute from LOS. We're going to see you at Hawaii at about 13:50. The maneuver's about halfway complete, and we can begin to see the temps coming up on the radiator. And I'll let you know, when we get to Hawaii again, how we're doing there.

CDR Okay, you see any improvement in the refrigeration loop?

CC Pete, we don't expect to see any in the loop itself until we can throw out whatever blockage is in the radiator, so the first thing to do is make sure that those temps are coming up, and they are.

CDR Okay. Good enough.

CC Roger.

PAO Skylab Control at 6 hours 50 minutes and 20 seconds Greenwich mean time; 13:39:35 phase elapsed time. At the present time we're about 1 hour and 54 minutes from the undocking procedure, beginning the undocking at 3:45 a.m. central daylight time. That is expected to go off on schedule. There is no question in the mind of the present Flight Director, Neil Hutchinson, that that should go on. Flight Director Phil Shaffer, who is on with his team as well, to conduct command module operations, is expected to continue those procedures as scheduled, despite the problem with the primary refrigerant loop in the orbital workshop. The flight directors are confident they can handle that problem without the use of the crew there, and they will be departing on schedule, as least as it looks now. During this last pass over Honey-suckle, the crew indicated that they were - had pressurized and were doing suit integrity checks. That shows that they're moving right along on the time line and certainly are not falling behind. During this maneuver, beginning at 06:43:20 - during this last pass at 06:43:20, or 02:43:20 central daylight time - I'm sorry, at 01:43:20 central daylight time, the spacecraft attitude change was begun using TACS gas. The decision here was that the command module occupants were too occupied with their - with their work to take time to maneuver the spacecraft using the command modules' jets. TACS usage is still a matter of concern, but because there is a - more than sufficient supply, most of the total TACS supply was used before the manned mission began. At the beginning of the manned mission 44.4 percent remained; as of this morning, about 43.3 percent remaining. We've only used about 1.1 percent of the total supply in the past month. A lot of that was used because of the problems with docking at the beginning of this manned mission. So it's a concern - no concern right now that we are getting close to the redline

01:15:00/2
01:15:00/2
01:15:00/2

on thruster attitude control system gas. For that reason they did do that maneuver using the TACS system. The immediate effect of that maneuver is quite clear from the displays here in Mission Control. The orbital workshop primary refrigerant - refrigerant tabulation shows that a - increase in temperature so far of about 12 degrees - 12-1/2 degrees, has occurred in that radiator surface temperature. And I'd like to make a correction on something given out earlier. That sensor now reads 57 degrees. It was reading approximately 69 at its - at its coldest point, and it - and that is approximately 95 degrees - I'm sorry, that's approximately 90 degrees lower than its - than its poor point, or its period of maximum slushiness. The information given out earlier was a reversible of those figures, indicating a temperature of 65 - a minus 65 degrees, and a - a 95 degrees difference. So, to correct that, the present temperature of that coolant fluid is about 57 degrees. It came down from 69 minus - it's now minus 57 degrees. That's a rise in temperature from the minus 69 degrees that we had seen at the beginning of Honeysuckle. So the coolant is warming up - warmed up about 12 degrees during that - beginning at that attitude maneuver, which would be completed after the Honeysuckle pass was over. It is now approximately 100 degrees above the temperature at which the coolant does not pour well. The maneuver again began at 06:43:20 Greenwich mean time. And that maneuver is to pitch the spacecraft 45 degrees, nose down, to bring the radiator area of the orbital workshop into the Sun for a short period of time, probably lasting from 45 minutes to an hour and a half. At the beginning of this Hawaii pass we should have an idea of the immediate effect of that. It has had an effect - not a necessarily a desirable one, a short-term immediate effect in the area of the wardroom freezers, and in the food freezers. Those temperatures did move up, they were moving up, however, before that. They are now reading in the neighborhood of 7 to 10 degrees. Several of them reading 8 and - one of them reading 0, one of them reading 9 degrees. On one of the wardroom freezers - not a matter of concern - not presently in use, is reading above the 10 degree limit which is set for normal operations. As was indicated earlier, a temperature at 10 degrees can be sustained for 24 hours with no adverse effects whatsoever to the food. It would have a degrading effect on one of the - on two - on a pair of experimental data - data that's from M073 and M071, two medical experiments, to determine precise constituents of the body. If - if those food is - food in the freezer should remain at a 10-degree temperature for a 24-hour period, it would have a slight - about 1 percent degradation of the

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SL-II MC-2350/3

Time: 01:47 CDT, 19:06:47 GMT

6/22/73

data for those two experiments. Certainly no concern in terms of a long-term Skylab mission, although a very slight change would occur in the data available from two medical experiments. So we expect at Honey - at Hawaii we should get some additional information on the effect of that attitude maneuver attempting to warm up the coolant in the radiator, which is used to release heat from the spacecraft into space. This is Skylab Control. We're presently 4 minutes and 45 seconds from acquisition of signal at Hawaii. We'll remain live for air-to-ground from Hawaii.

END OF TAPE

0

24888

SC-11 NC-1331/1
Time: 01:50 CDT, 20:06:50 GMT
6/22/73

CC Skylab, Houston. Hawaii for 9 minutes.
CDR Roger, Houston. Be advised that all
12 docking latches are undone, tunnel hatch is installed,
and we have a DELTA B at 2.6 at 6 minutes and it's still
going down.

CC Roger, CDR. Copy.
CDR And on the DSKY and the present
angle for the vehicle, it looks like you know where it
is pretty good, I'm showing 27862, 31380, 31061.

CC Roger. Copy.
CC And Skylab, Houston. Be advised we've
had a couple of minutes here to look at the refrigeration
system data. The radiator temperatures are coming up as
we expected, apparently that old problem isn't solved yet,
because we still have a (garble) DELTA P that's not where it
should be, but the basic purpose of the maneuver is being,
as we expected, is to get the radiator temps up first and that's
happening and I'll keep you posted.

CDR Okay, thank you.
CC Skylab, Houston. Since we uplinked
the teleprinter pads - are the pads to you on the teleprinter
earlier today and we did on each of those pads had double numbers
on them, it's your choice as to whether you'd like to read them
back for - to make sure that you got them correctly. If you
would like to, we still got 5 minutes here at Hawaii and
we got a stateside pass coming up so just let us know.

CDR No, they're - they're all good. I copied
them in the book, I understand all of them.

CC Okay, Pete. I've also copied them into
my book and FIDO has checked them again and as of now there GO.

CDR All right. I haven't configured the
DAP yet, but I will.

CC Roger.

CC And CDR, Houston. We don't think there's
any particular hurry for you to reconfigure the DAP, as a
matter of fact, until we kind of find out where we are,
with respect to this refrigeration system problem.

CDR I understand and we'll be happy to
maneuver for you if we have a free moment.

CC Okay.

CDR Right now, we're pretty busy.

CC Okay.

END OF TAPE

SL-11 NO-111/1
Time: 02:07 GMT 19:07:07 GMT
6/22/73

CC Skylab, Houston. We're about 30 seconds from LOS. We'll see you at Goldstone at 14:01.

CDR Roger. 14:01.

CC Skylab, Houston. AOS Goldstone for 6 minutes. Request ACCEPT. We're going to up-link that state vector gyro compensations and a PIPA bias for you here.

CDR Okay, you got it.

CC Thank you.

CDR You still there, Houston?

CC That's affirmative, Pete. We got about a minute left before LOS here at Goldstone. Go ahead.

CDR No, I was just watching the up-link, and it didn't look like much was going on, and I wondered whether you got it all in.

CC Stand by 1.

CC CDR, Houston. Negative. We're not through up-linking. We're still doing the PIPA bias update. For your information, we think we probably will be coming out of this SWS maneuver attitude probably at Bermuda, which is coming up AOS at 14:12. We'll look at the data there before making a final decision, and the maneuver time that we think that we'll be using is 15 minutes.

CDR Okay. I just completed the EMS checks. Entry checks are okay. The null bias is now plus 1 foot per second for 1 minute and 40 seconds.

CC Roger. Copy.

END OF TAPE

SC-17 KC-1353/1

Time: 02:19 CDT, 19:07:19 GMT
6/22/73

CC Skylab, Houston AOS Bermuda 9 minutes.
CDR Roger, Houston. Be advised we have
a good tunnel and it's vented.
CC Real good, Pete. Thank you.
CC Skylab, Houston. Everything is loaded
up there, you can go back to block, thank you.
CDR I still show an uplink activity light
on and a bunch of stuff in the DSKY.
CC Stand by.
CC Skylab, Houston. Good catch, we were
hand loading all those commands which was one reason
they were going so slow and we made one error on the ground,
thank you much. You can go back to block now.
CDR That is a good load I got in there,
210102741456.
CC That's affirmative, Pete. That's a
good load.
CDR Okay.
CC Skylab, Houston. We still have about
5 minutes in the pass here at Bermuda, be advised we made
the decision that we're going to remain in this attitude
until the Ascension pass and we're going to come out of the
maneuver and back to the fly-around attitude at Ascension.
We'll use a 15-minute maneuver time and this will put
you in an attitude in time to undock and do the fly-around
as planned.
CDR Very good. Has that salvaged your
refrigeration system?
CC Well, I tell you Pete, the numbers tell
us that it's - we hope it's heading in the proper direction, but
we won't know for sure until we get back in solar inertial.
So we really aren't sure yet, but it looks encouraging.
CDR Okay. I hope so.
CC Me too.
CDR Houston, are you there?
CC Affirmative, go ahead.
CDR You want us to hold the P52 until 15:03 or
do you want us to go ahead with it now?
CC Well, we were just talking about
that, hang on a second.
CC CDR, Houston. We think it is okay, if
you want to, to go ahead and do the P52 now. The stars that
you ought to use are stars 1 and 2 in this attitude but be
advised you should delay the GDC align naturally until we
get back into the fly-around attitude.
CDR Yes, I understand.
CC Roger.
CDR Hey, Houston are you there?
CC Affirmative, we've got 1 minute left,
go ahead.

END OF TAPE

SL-II MC-1354/1

Time: 02:31 CDT 29:07:31 GMT

6/22/73

CDR
CC

Hey, Houston. Are you there?
Affirmative. We got 1 minute left.

Go ahead.

CDR Okay. Now you had me scratch out this RCS
thrusting prep, but you are going to have an RCS hot fire.
I guess I'm not exactly sure of what we're doing I guess we're
doing an RCS hot fire on the quads rather than on the PSM,
is that what it is?

CC

That's affirm, Pete. That is what we're
doing.

CDR
CDR
hot fire?

Okay.
And where did you want to do the RCS

CC
CC

Stand by.

CDR, Houston. We plan to watch the
hot fire at - hot fire at Carnarvon at 15:02. (Laughter)

CDR Carnarvon at 15:02. All right. We'll
have a (garble) fire for you.

CC

Rog.

PAO

This is Skylab Control at 7 hours 33
minutes Greenwich mean time. Bermuda has LOS. Canaries
will pick up in about a minute. There's overlapping cov-
erage at Ascension. We'll start the maneuver back to solar
inertial at Ascension. Temperatures on the radiator have
come up considerably while the spacecraft has been in this
pitched attitude, come up about 65 degrees, and we're down
about minus 85 degrees at Carnarvon, the last pass. Bermuda
they were down to about minus 20 degrees. Astronaut Dick
Truly is the CAP COMM now. And it appears we will start
the maneuver at the Canaries now. And we have acquisition
of signal through Canaries. We'll stand by.

CC

Skylab, Houston. We're AOS Canary and
Ascension for 15 minutes and be advised we've started the
maneuver back to solar inertial.

CDR

All righty. And let me give you our
P-52. Star 01, Star 02, 5 balls plus 00037, minus 00064,
minus 00040, the time 14230000. And then Dick, let me
verify a few things with you. I'll read you some pads, just
a second.

CC

Okay.

CDR

Okay, lets verify the sep pad. I have
SEP 01629 1300 minus 0050 all zips, all zips, now 22 181
011359, N/A 0023, N/A, N/A, N/A, 2A151 plus 01, excuse me,
plus 077, minus 003 and - it's a plus 003.

CC

Roger. With that plus that's a good
readback, Pete on the sep pad.

CDR

Okay, let's try shaping. 016 54 4300
255 - minus 2538 plus 0000 plus 0653 359 198 000 2492 0010

SL-11-10-1354/2

Time: 02:31 CDR 19:07:31 GMT
6/22/73

3030 144 2815 plus 077 plus 003 and that's it for that.

CC And that's a good read-back on the
shape pad.

CDR AN retro 09 59 5978 minus 184.5 plus
all balls plus 0455 000180 000 1750 0007 0400 14 4 27420
plus 078 minus 009 CMRCS (garble) are HP is equal to 44
nautical miles.

CC And that's a good read-back on the
retrofire pad.

CDR And let's try entry. Area 5615 Golf
041 plus 2477 minus 12707 11659 25980 2526 2600 minus 03064
roll right 55 55 3040 2547 2926 3333. One target north
of ground track, 2- lift vector up, 3- pitch for (garble)
61 degrees.

CC Roger, Pete. Good read-back on all the
pads.

END OF TAPE

02:12:00 29:07:38 GMT
6/22/75

CC Roger, Pete. Good reading back on all the pads.

CC Skylab, Houston. We don't see the VHF on yet, and we think it probably should have been configured on - on page 2-81 of the Deactivation Checklist, which would have led you to page 3-5, I think of the Systems Checklist, CSM Systems Checklist.

CDR That's a sneaky way to get there.

CC Skylab, Houston. On this maneuver back to solar inertial attitude, we are spending a little TACS, and it is conceivable that we might get the CMC auto reset, just to let you - be advised no action required and no particular concern.

CDR Okay. How soon are we going to be back in attitude?

CC Stand by 1.

CC Skylab, Houston. We've got 1 minute left in the maneuver. Pete? (garble)

CC And, Skylab, as we go over the hill, we'll see you at Carnarvon at 15:02.

CDR Okay, and all you want to do is fire the jets that are turned on presently, that right? I can't really decipher much out of this thing.

CC Well, CDR, if we can't let you know here, but I'll have a good description of it when we come AOS at Carnarvon.

CDR Okay.

PAO This is Skylab Control at 7 hours, 51 minutes Greenwich mean time. Ascension has had loss of signal just as the maneuver back to solar inertial attitude was being completed by the orbital assembly. We'll take a look at that refrigerant loop over the next station or two and see how well that maneuver helped the problem. Next station to acquire will be Carnarvon in about 21-1/2 minutes. Crew is using phase elapsed time or PET for their entry activities; 20 hours of PET equals retrofire. This is a time system that can be updated and adjusted without affecting the Greenwich mean time we're at 14 hours, 41 minutes phase elapsed time at the present time. Undocking scheduled in about 52-1/2 minutes. That will take place out of contact with ground station. Undocking scheduled between Guam and Goldstone on this revolution. Undocking time still scheduled for 8 hours 45 minutes Greenwich mean time, or 3:45 a.m. central daylight time. We'll come back up prior to acquisition at Carnarvon. At 7 hours 53 minutes Greenwich mean time, this is Skylab Control.

END OF TAPE

SC-11 NO-1156/1
Time: 03:10 CDT, 29:08:10 GMT
6/22/75

PAO This is Skylab Control at 8 hours
11 minutes Greenwich mean time. Skylab coming up within
range of the Carnarvon station very shortly. We'll stand by.

CC Skylab, Houston. AOS Carnarvon for
8 minutes.

CDR Hi there, Carnarvon. How are you?

CC Just fine, sir, and you?

CDR Okay. I think I got this thing figured
out, if you guys are happy.

CC Roger, Pete. We are, we want to look
at the SWS attitude control system real carefully before we
do the hot fire check and also want to make sure we got our
backroom recorders all turned up to (garble) before we give
you a GO to do the check.

CDR Yes, all you're going to see is 4 thrusters,
right; 2 pitch, and 2 yaws, right?

CC That's affirmative.

CDR And it's going to mid-impulse, right?

CC That's affirmative.

CDR Yea. I figured it out by myself.

CC And, CDR; Houston. We're not going to
start the heart - hot fire check here right now; we're going
to work with the SWS and make sure the attitude control
system is squared away.

CDR Okay, what do you want to do? Do it
at Guam?

CC No we - no we haven't given up doing
it here in Carnarvon but we're just standing by at the
moment.

CDR Okay. Can I go VERB 46 and get all
primed and ready that so when you want it, I can give it to you?

CC That's affirmative, Pete. Go ahead.

CC Skylab, Houston. Be advised we're not
going to be able to do the hot fire check here at Carnarvon.
We're going to do a nominal age gage to improve our momentum
position so we can stop using the TACS and we will try to pick
it up at Guam.

CDR Okay. Now are my - I've aligned by GDC
to the unback attitude. Is that good or not?

CC Stand by.

CC CDR, Houston. The GDC should be aligned to
213.510 and zero for a pen and ink on page 2-85.

CDR That's right. I want to know if that's
good attitude right now; I'd like to realign it again.

CC That's affirmative, Pete. That is good
attitude.

CDR Thank you. Okay, you guys interested in
my 4 hours 52 minutes GDC drift check?

CC Of course we are Pete, go ahead.

CDR Okay, I started on a Greenwich mean time
of 03:07, at least I assume that's what you had in the

SC-11 NC-1356/2

Time: 05:10 CDT, 29:08:10 GMT
6/22/75

computer for awhile. As best as I can decipher it, I stop it at 07:39, which comes out to 4 hours and 52 minutes. And now 20 - was 286 22 32223 35205, and the thumbwheels wound up at 2755, 3518, and 3586, which isn't too bad.

CC

Roger, Pete. Copy.

CDR

And in sec, coolant loop pump is on

AC2.

CC

Roger. And, CDR; Houston. Nominal H cage has been commanded.

CDR

Okay.

CC

Skylab, Houston. On the electrical power system, we would appreciate if you would configure descent battery 2 on Main A. The reason is descent batt 1 is getting a little warm and we're trying to manage the temperatures a little bit. We do want to leave - we do want to leave batt 1 still on Main A also.

CDR

How's that?

CC

Roger.

CC

Skylab, Houston. We're about 1 minute from LOS. We're going to see you at Guam at 15:17, and be advised that total attitude excursion of this maneuver about 40 degrees, 40 degrees.

END OF TAPE

SL-IT MC-1957/1

Time: 03:21 CDT 29:08:21 GMT

6/22/73

PAO

This is Skylab Control at 8 hours 23 minutes Greenwich mean time. Skylab out of range of the Carlsarvon station now. Guam will pick up Skylab in about 4-1/2 minutes. The hot fire check of the service module reaction control system has been delayed to allow the Saturn workshop to settle down in a stable attitude. Anticipate now that that check of the RCS will take place over the Guam station. The flight director was informed a few minutes ago that it still was too early to tell about the refrigerant loops. It could be several hours yet before enough information is available to determine how effective the pitch maneuver was to put the radiators in the Sun. The workshop now back in solar inertial attitude, but not yet quite settled down after maneuvering back from that pitch maneuver. Undocking scheduled to take place after a loss of signal at Guam and before Goldstone acquires. The command module flyaround will take place immediately after undocking, and when we acquire at Goldstone in about 26-1/2 minutes from this time, we should get live television during the flyaround. We're about 2 minutes away from acquisition at Guam. We'll continue to stay up live.

END OF TAPE

SL-11 NC-1358/1

Time: 03:26 CDT, 29:08:26 GMT

6/22/73

CC Skylab, Houston; AOS Guam 5 minutes.
CDR Roger, Houston.
CC And, Pete, we're still looking at attitude control system to see if we can get it squared away in time to get the check done. In the event that we can't get it squared away in time, we'll just skip hot fire check.

CDR Okay.
CC Skylab, Houston. Be advised we're going to scrub the hot fire check. We're having some problems with the rate gyros in the SWS, so we're just not going to do it this pass.

CDR Okay.
CC Skylab, Houston. We're about 30 seconds from LOS. We're going to be at Goldstone at 15:41. We are unable to give you a GO for undocking because we have not gotten the SWS into ATT HOLD CMG due to (garble) rate gyro failures. And, we're getting - trying to get configured - we will get configured at AOS Goldstone as soon as possible and give you a GO for undocking there.

CDR You do not want us to undock at 34. Is that what you're telling me?

CC That's affirmative, Pete.
PAO This is Skylab Control at 8 hours 35 minutes Greenwich mean time. Crew has a NO GO for undocking at the nominal time. The Saturn workshop not yet settled down into proper attitude. Anticipate undocking over the United States now, after acquisition at Goldstone. Here on the ground the controllers want to take another look at the attitudes prior to giving a GO for undocking. We're 15-1/2 minutes away from acquisition at Goldstone. We'll come back up just prior to that pass. At 8 hours 36 minutes Greenwich mean time, this is Skylab Control.

END OF TAPE

21-11 NO-1359/1

Time: 09:47 CDT 29:08:47 GMT
6/22/75

PAO This is Skylab Control at 8 hours 48 minutes Greenwich mean time. Skylab is a few minutes away from acquisition at Goldstone, where another GO/NO GO status check will be taken for undocking. Undocking has been delayed because the Saturn workshop attitude has not yet settled down. Several hours ago it became apparent the refrigerant loop radiators on the workshop were getting too cold, were approaching a temperature at which they could freeze. It's believed, but not fully known at this time that the high Beta angle has something to do with this problem. The space station is in 100 percent sunlight, however the Sun is so high that it does not shine on the radiators as it normally does at lower Beta angles. So the assembly was pitched 45 degrees down to put the radiators into the Sun and then over Canaries on this revolution the space station was maneuvered back to the solar inertial attitude; however at loss of signal at Guam, the orbital assembly had not yet stabilized and a decision was made not to undock at the regular time. We should be acquiring at Goldstone within about the next minute. We'll stand by for conversation there.

PAO

Television coming in now.

CC

Skylab, Houston. We're AOS Goldstone.

Be advised we've got three commands to get into the burn: Y-2 drift update, get Y-2 into the control loop, and then command into ATT HOLD CMG, and then you'll get a GO for undocking.

CDR

Roger. We're standing by.

CC

Roger, and we got good television, Pete.

CDR

Okay.

CC

Incidentally, Pete, in our estimation, we think probably if we can't get you off here at Goldstone or very shortly, that probably you will have time to get around on a complete flyaround, if you concur.

CDR

Roger. Wilco.

CC

Roger.

CDR

We haven't done anything by the flight plan yet, so we'll go by ear again.

CC

Roger that.

CC

Skylab, Houston. We're in ATT HOLD

CMG. You're GO for undocking.

CDR

Okay. Stand by.

CC

Roger.

CDR

Okay, we're free. We got 4/10 of a foot per second, Houston.

CC

Roger.

CDR

Bye-bye, Skylab.

END OF TAPE

SL-IT MO-1360/1
Time: 03:55 CDT, 29:08:55 GMT
6/22/73

PLT Houston, that TV just isn't working well
on peak.

CC Roger. Suggest you try average. We're
about 40 seconds away from about a 1-minute dropout between
Goldstone and Texas and that television did look a little
bit better when you changed it.

PAO Skylab Control. We've had loss of signal
at Goldstone. Texas will pick up very shortly. Command and
service module now undocked - undocking at 8 hours 55 minutes
Greenwich mean time. And we're at Texas.

CC Skylab, Houston. We're AOS again at Texas
and we got you for the next 12 minutes and we got a picture.

CC Skylab, Houston. We believe we'd like
to try peak again on the TV and take a look at that.

PLT I'm ahead of you again.

CC I know. You got our loop up there again.
This is quite a sight to all us guys on the ground who
haven't seen it yet.

CC And, PLT, Houston. I guess peak is just
too much. Like to return to average.

PLT Yes, that's peak at f/16.

PAO This is Skylab Control. Those landing
gear-like extensions are the dipole antennas.

END OF TAPE

SL-11 NG-1361/1
Time: 04:04 CDZ, 29:09:04 GMT
6/22/73

CC PLT, Houston. Another suggestion is go back to peak on television and open up the f-stop wide open. And if that doesn't work we'll come back to where we are.

PLT Yeah, it's in now, Dick.

CC Roger. I understand the f-stop's wide open now. Is that right?

PLT That's right.

CC Roger, Paul. I guess we'll go back to where we were. Still can't get a heck of a lot of detail.

PLT Okay.

PLT Did y'all turn the TV off?

CC Skylab, Houston, affirmative. We had LOS at Mila. So, just a reminder, you can go ahead to S-band AUX TV to OFF and f-stop to fully closed.

PAO This is Skylab Control. We're still in acquisition through Bermuda. However, no television capability through that station. About another minute and a half, acquisition at Bermuda.

CC Skylab, Houston we're 45 seconds from LOS. We'll see you a Ascension at 16:09.

PLT Roger, Dick.

PAO This is Skylab Control at 9 hours 11 minutes Greenwich mean time. Bermuda has loss of signal. When we lost the television picture at the Merritt Island station, command and service module was about a quarter of the way through its flyaround. It moved above and over the Saturn workshop. Undocking was about 13 minutes late and we estimate that Pete Conrad has picked up about 3 minutes on the flyaround time line since undocking, however. The separation maneuver still scheduled at the normal time, Greenwich mean time of 9 hours 40 minutes, or 4:40 a.m. central daylight time. That is just over 27 minutes from now. Canary Island station - no - no, the next acquisition will be Ascension in about 6-1/2 minutes. At 9 hours 13 minutes Greenwich mean time, this is Skylab Control.

END OF TAPE

SL-11-NO-1542/1
Time: 04:17 CDT 29:09:17 GMT
6/22/72

PAO This is Skylab Control at 9 hours 17 minutes Greenwich mean time. Coming up on acquisition through Ascension now. We'll stand by.

CC Skylab, Houston. AOS Ascension for 5 minutes.

CDR Roger, Houston.

PAO This is Skylab Control. The command and service module flight controllers are taking a good look at the systems on that vehicle. The GO/NO GO decision for separation will be made here at the Ascension station.

CC Skylab, Houston; we're about a minute from LOS. We're going to see you at Carnarvon at 16:39. The controllers have looked at the CSM, and it looks real good. You're GO for a separation. And in the event you guys are getting warm, when you get a reasonable distance away from the SWS, it's okay to activate the evaporators.

CDR Roger, Houston.

PAO This is Skylab Control at 9 hours 25 minutes Greenwich mean time. Ascension has loss of signal. Carnarvon will pick up the spacecraft in about 24 minutes. A GO has been given for the separation maneuver. That's scheduled to take place 13 minutes 40 seconds from this time, while the spacecraft is over the Indian Ocean. That's a 5 feet per second maneuver using the service module reaction control system. The duration of the burn 23 seconds. Greenwich mean time of that maneuver is 9 hours 40 minutes. This maneuver will put the command and service module in a slightly lower orbit than the space station, and the CSM will gradually move ahead of the Saturn workshop. We'll come back up just prior to Carnarvon. At 9 hours 27 minutes, this is Skylab Control.

END OF TAPE

SL-11 NO-1363/1
TIME: 04:48 EDT, 19:09:48 GMT
6/22/73

PAO This is Skylab Control at 9 hours 48 minutes Greenwich mean time. Spacecraft's coming up on acquisition at Carnarvon very shortly. Separation maneuver should have been performed. And we're about 17 minutes away from the shaping maneuver, the first of two burns on the big service propulsion system engine. This shaping maneuver will take place while we have acquisition through Guam, shortly after AOS at Guam. We'll stand by for the Carnarvon pass.

CC Skylab, Houston. AOS Carnarvon for 11 minutes, and standing by for your sep burn status.

CDR Burn on time, 5 feet per second. Negative.

CC Roger.

PAO That report by Pete Conrad says the separation burn went exactly as planned.

CC Skylab, Houston. We got about 10 minutes here at this pass. I'm not sure how busy you guys are. I have one little checklist change to make on page 5-4, about descent batt 2, that I'd just as soon get out of the way while - and get ahead, anytime you guys get a chance.

PLT Which book, Dick?

CC Entry, Paul.

PLT Okay, go ahead.

CC Entry book page 5-4 - right after the last line it says "abort system propellant RCS command verify." Just add, take descent batt number 2 off main A, and this is the one we just had you put on, and the reason is to give it a few minutes to be conditioned prior to separation.

PLT Understand.

CC Roger.

CC Skylab, Houston. We've looked at the bird. It looks real good to us. You're GO for the SPS-1 shaping burn, and a reminder, after the shaping burn, we'll be watching it at Guam, and when it's complete, we'll be configured to watch you do to logic sequence check.

CDR Okay.

CC Skylab, Houston. We're going LOS. See you at Guam at 16:53.

PAC This is Skylab Control at 10 hours 1 minute Greenwich mean time. Carnarvon has had loss of signal. Guam will acquire in about 2 minutes. And we're 4 minutes 10 seconds away from the shaping maneuver. This is the one entry maneuver that will be performed over tracking station. Shaping maneuver is designed to take the spacecraft out of a near-circular orbit into an elliptical orbit approximately 90 by 236 nautical miles. That's about 104 by 269 statute miles. We should be acquiring at Guam shortly, and we'll stand by for that shaping maneuver.

END OF TAPE

SL-11 NC-1304/1
Time: 09:02 GMT 29:10:02 GMT
6/22/73

PAO - Greenwich mean time, the maneuver is
10 hours 5 minutes 30 seconds.

CC Skylab, Houston. Standing by at Guam
for 9 minutes.

CDR Roger, Houston. We're in the final
count for the burn. Everything looks good.

CC Roger, Pete. We're looking at the
data, looks good to us too.

CDR (garble) all the horizon checks. Every-
thing looks fine.

CC Roger.

PAO This will be a 10-second burn of the
service propulsion system. Delta V or change in velocity
of 264 feet per second.

PAO We see ignition.

PAO The burn looked good here. We'll stand
by for a crew report.

CC Skylab, Houston. We watched the burn
on the data and we got everything but the Delta V counter.

CDR I had 14.1.

CC Thank you, Pete.

CC And CDR, Houston. Be advised we're
configuring on the ground to look at the logic sequence
checks whenever you get secured from the burn. We still
got about 5 minutes left here at Guam.

CDR Okay.

CDR Okay, we're ready to give you the
logic sequence, SEQ logic.

CC Roger.

CC Roger, Pete. We're ready on the ground
for your cleared SEQ logic 2, I'm on UP.

CDR There they are. On UP.

CC Stand by.

CC Skylab, Houston. It looks good. You're
GO for power alarm.

CDR Roger, Houston.

CC Skylab, Houston. One minute to LOS.
Goldstone at 17:20.

CDR See you then.

CC Roger.

PAO This is Skylab Control at 10 hours
14 minutes Greenwich mean time. Guam has loss of signal.
Next station to acquire will be Goldstone in about 16
minutes. The command and service module shaping maneuver
was performed right at the start of this Guam pass. It
was a successful maneuver, a good burn. That's the first
step in the deorbit procedure. One more maneuver remaining

SL-11 SC-13A-12
Time: 09:02 CDT 10:10:02 GMT
6/22/73

the retrofire burn of the big service propulsion system engine. We're 2 hours and 55 minutes away from that maneuver. We'll come back up prior to the Goldstone Acquisition. At 10 hours 15 minutes Greenwich mean time, this is Skylab Control.

END OF TAPE

SL-11-10-1345/1
1970-10-20 00:10:20 GMT
07/11/79

PAO This is Skylab Control at 10 hours 21 minutes Greenwich mean time. In the control center there is a shift handover taking place for the Saturn workshop flight controller teams. Flight Director Neil Hutchinson and his team being relieved by Flight Director Milt Windler and his team. Neil Hutchinson will have a change-of-shift news conference in the Johnson Space Center news briefing room, approximately 5:30 a.m. central daylight time. Change-of-shift news conference with Flight Director Neil Hutchinson at approximately 5:30 a.m. central daylight time in the Johnson Space Center news briefing room. Flight Director Bill Shaffer will continue here as the command and service module flight director with a separate team of flight controllers. CAP COMM is Astronaut Dick Truly. At 10 hours 22 minutes, this is Skylab Control.

END OF TAPE

0
2507

62-11-NC1370/1

Time: 07:25 CDT, 29:12:25 GMT

6/22/79

PAO This is Skylab Control at 12 hours 25 minutes Greenwich mean time. Command and service module coming up within range of the Vanguard tracking ship now beginning its last revolution. We'll reenter during this revolution. We'll stand by for conversation at Vanguard.

CC Skylab, Houston. We're AOS Vanguard for 6 minutes.

CDR Roger, 6 minutes. Houston, any particular time or I was going to - -

SC - - burn attitude. About 19:30 start the maneuver, if that's all right.

CC Stand by 1.

CC Roger, CDR. That time will be real good.

CDR Okay.

CC And if you guys would like to hear about the weather at the recovery area, I'll give it to you here.

CDR Okay.

CC It's real pretty out there. It's a 2,000 foot broken, 10 miles visibility. There's about a 12 knot breeze blowing. The wave heights are four feet. Air temperature is 67 degrees. There'll be two helos in the area (garble) recovery and swim. And you're being awaited by the U.S.S. Ticonderoga. And we're waiting to see you back here in Houston, too.

CDR Alrighty. You can relay to the Tico, we've got their fox corpen and our hook is down.

CC Roger that.

CC Skylab, Houston. Everybody around here has looked at the bird, and it looks real good. You're GO for SPS-2 deorbit and entry. There's an Aria out there that will be talking to you after the blackout, so we'll see you there. Have fun.

CDR Roger, roger.

CC We still got about 2 more minutes left here at Vanguard and I'm standing by.

CDR We're worried about this 90 miles perigee we're at right now or close to it. It looks like we're going to run into the ground it looks so low.

CC Roger.

CDR We had a lovely tour down the Andes Mountains there.

SC You know on launch day Pete wouldn't let us look out the window, so this is our first look down this low.

CC Roger. I know you guys have been in sunlight for a long time and you're going to miss darkness by just about 10 minutes, because Fido tells me you're never going to

SL-11 N01369/1
Time: 07:09 CDT, 29:12:09 GMT
6/22/73

PAO This is Skylab Control. The Texas station has an antenna problem, they're working to try to correct it now.

CC Skylab, Houston. We've got all the uplinks in and you can go back to block. And if you have the time, if you'll call up NOUN 91 and compare it to (garble), we'd appreciate it.

CDR Okay, Dick. You probably see NOUN 91, and it does in this case agree with the (garble).

CC Roger. And when we saw the problem before, Joe the optics was in the zero mode. We're about 20 seconds from LOS. We're going to see you at Vanguard at 19:16.

CDR (garble)

CC Roger.

PAO This is Skylab Control at 12 hours 13 minutes Greenwich mean time. Texas does have loss of signal. The Vanguard will acquire in about 14 minutes. Vanguard is the last of the regular tracking stations that will be in contact with the crew on this mission. There will be at Aria on station that we hope to pick up communications through right after blackout ends. Ignition on the retrofire maneuver is 56 minutes 36 seconds from this time. That maneuver will be performed out of sight of any tracking station. We'll come back up just prior to acquisition at Vanguard. At 12 hours 14 minutes, this is Skylab Control.

END OF TAPE

SL-11 NC-1368/2

Time: 17:00 CDT, 29:12:00 GMT

6/22/73

CC Okay, what we'd like you to do is leave the mode switch where it is and call up NOUN 91. And we'll look at it on the ground, and you can compare it to your (garble). And we've seen funny readings in our telemetered trunion reading. And this ought to confirm - help us confirm where the problem is, if any.

CDR Yeah, well I think we have a problem, Dick. Joe has had to - we had to redo this last P52 here. I'll let him tell you.

CC Roger.

SPT On two P52's Dick, the first time I let the auto optica take me to a star, the NOUN 92s were okay, but the trunion didn't go there. It went to (garble) instead. And in most cases the problem was solved by (garble)

CC Roger. Copied everything except in most cases the problem was solved by what?

SPT By zeroing the (garble).

CC Skylab, Houston. We dropped out for a second, just for a second, stand by please.

CC And Skylab, we'll be unable to do this procedure that I mentioned until we get through with uplinks.

SPT Roger.

END OF TAPE

31-11 MC-1368/1
Time: 07:00 CDT, 29:13:00 GMT
6/22/73

PAO This is Skylab Control at 12 hours Greenwich mean time. Goldstone will have acquisition within the next couple of minutes. This will be the crew's last look at the United States from orbit. The space flight meteorology group of the National Weather Service, National Oceanographic and Atmospheric Administration, said weather conditions this morning will be satisfactory for landing and recovery of the crew. The landing area in the eastern Pacific about 800 miles southwest of San Diego will have typically cloudy skies consisting of a thin layer of stratus at about 2000 feet, north-northeast winds of 10 to 12 knots, wind waves of 1 to 2 feet, long swells of 5 to 6 feet, and temperature near 67 degrees. We'll stand by for acquisition through Goldstone.

CC Skylab Houston. AOS stateside for 9 minutes.

CDR Hello there. You want P20 in ACCEPT?

CC Yes sir, we sure do, and we'll give you some state vectors and P30 targets. And we're standing by for your P52 results. And when we confirm we have data, we want you to activate the command module RCS.

CDR Okay sir. The stars were 35 and 43. The SPT did an outstanding job with 5 balls plus 00128, plus 00044, minus 00101, the time 18:32:00:00.

CC Roger, got it.

CDR Okay. What would you like us to do, pressurize the RCS?

CC Roger. Stand by just a second please.

CC CDR, Houston. Affirmative. We're looking at the data and we're ready for you to proceed.

CDR We go to turn on the logic.

CC That's affirmative, Pete. You're clear.

CDR Okay.

CC Skylab, Houston. You're GO for power alarm.

CDR Okay, they're ARMED.

CC Roger.

CDR Okay, looks like we got both of them.

CC Roger. We concur, Pete. They look good on the ground too.

CC And Skylab, Houston. When we get through with this RCS activation to your satisfaction, we've seen kind of a funny in the optics I'd like to talk about for a second and get you to run through a little procedure for us. And we'll find out if it is onboard or on the ground.

CDR Okay. We see a little funny in the optic, too. It doesn't point right the first time. Go ahead with your procedure.

SL-11 MC-1367/2

Time: 06:23 CST 29:11:23 GMT

6/22/73

That's 33 minutes 36 seconds after retrofire. The main parachute deployment at 13 hours 45 minutes 5 seconds, or 34 minutes 32 seconds after retrofire. And landing at 13 hours 49 minutes 57 seconds or 39 minutes 14 seconds after retrofire. The coordinates of the landing point are a latitude of 24 degrees 46 minutes north longitude 127 degrees 4 minutes west. We'll come back up just prior to acquisition at Coldstone. At 11 hours 34 minutes, this is Skylab Control.

END OF TAPE

SL-11 MC-1367/1

Time: 06:25 GMT, 29:11:25 GMT

6/22/73

PAO This is Skylab Control at 11 hours 26 minutes Greenwich mean time. We are going to try to contact the crew for a VHF, or very high frequency radio check at Carnarvon. The spacecraft will be out of range for S-band. But a VHF radio check will be tried very briefly at Carnarvon. We're within a few minutes of that check, about a minute and a half. We'll stand by for that.

CC Skylab, Houston. We're AOS at Carnarvon through VHF for 2 minutes.

CC Skylab, Houston. We're AOS Carnarvon, VHF, for a couple of minutes.

SPT Roger, Houston. How do you read?

CC Roger. Read you loud and clear. And I have a little bit of good news for you. The FIDO made his run so well prior to your undocking that there are no updates required for the retrofire pad or the entry pad. How about that?

SPT Okay. Thank you.

CC Roger.

CC Skylab, Houston. We're about a minute from LOS at Carnarvon. We're going to see you at Goldstone at 18:53. And we're wondering if you accomplished P52?

PLT Not since the burn, Dick.

CC Roger.

CC We'll see you at Goldstone at 18:53.

PLT Okay.

PAO

This is Skylab Control at 11 hours 30 minutes Greenwich mean time. That VHF radio check through Carnarvon was successful. And we passed up to the crew the information that no updates will be required for the retrofire or the entry pads. Retrofire scheduled for 1 hour 39-1/2 minutes from this time, at a Greenwich mean time of 13 hours 10 minutes 46.8 seconds. The command service module is still 32 minutes from acquisition at Goldstone. The fact that no updates are required for the entry pad make all of those numbers previously released still good. We'll review them here now. The separation of the command service module is scheduled for 13 hours 15 minutes 50 seconds Greenwich mean time. Command module enters the atmosphere at 400,000 feet, at 13 hours 33 minutes 47 seconds, or 23 minutes 4 seconds after retrofire. Blackout begins at 13 hours 36 minutes 32 seconds, that's 25 minutes 49 seconds after retrofire. Blackout ends at 13 hours 40 minutes 12 seconds, 29 minutes 29 seconds after retrofire. The maximum G load is reached at 13 hours 41 minutes 23 seconds, or 30 minutes 40 seconds after retrofire. And that G load on the crew will be 3.6. Drogue shoot deployment at 13 hours 44 minutes 19 seconds.

SL-11 NC-138872

Time: 05:44 CDT, 29:10:44 GMT
6/22/73

service module undocked from the Saturn workshop about 13 minutes late. Undocking was at 8 hours 55 minutes Greenwich mean time over Goldstone. We had live television at undocking and for the early portion of the flyaround of the Saturn workshop. The separation maneuver, the 5-foot-per-second reaction control system burn was performed on time, and was a good burn. And on Guam - over Guam, on the last revolution, we performed the first step in the deorbit procedure, a service propulsion system burn, shaping burn, which ellipticized the orbit, looking for a perigee of 90 miles - 90 nautical miles with that burn. That again, was an ontime burn and looked good. The next and the last maneuver in this deorbit sequence, is retrofire. That will take place approximately 2 hours and 21 minutes from now. It will not take place within site of the tracking station. Everything going well aboard the command and service module. And as we passed up to the crew, we still do not understand the refrigerant loop problem. That's still being worked here on the ground and looked at very carefully. At 10 hours 50 minutes Greenwich mean time, this is Skylab Control.

END OF TAPE

SL-11 NC-1366/1
Time: 03:44 CDT, 29:10:44 GMT
6/22/73

PAU This is Skylab Control at 10 hours 44 minutes Greenwich mean time. We've had loss of signal at the Merritt Island Station. Skylab will not be acquired again until it reaches Goldstone acquisition, an hour and 18 minutes from now. There was a very little conversation during this last stateside pass. The crew inquired about the status of the refrigeration loop on the orbital workshop. Were informed that we still do not understand the situation there yet. We accumulated 2 minutes and 20 seconds worth of tape during that pass. We'll play that now.

CC Skylab, Houston. AOS stateside for 12 minutes.

SC Roger, Houston.

CC Skylab, Houston. Go ahead.

SC Roger. How does our refrigeration system look?

CC Roger. Let me get you an update on that and I'll get back to you in just a second.

SC Okay. We're doffing suits. We're going to have a little lunch.

CC Okay. Good.

CC Skylab, Houston. For your information, we still do not understand the refrigeration system problem in the SWS. The temperatures in the coolant loop, itself, are still slowly on the increase. So, I really can't spell out much more of a detailed briefing for you now. We did discover the first indication of a problem, occurred about 20 minutes or so before any action that you guys took during the deactivation. So, although, in the end when we took the frozen urine out of the freezer, there may have been some effect of that thermal spike on the system of the - The problem was strictly coincidental and it occurred prior to you guys getting to that point in the checklist. Over.

SC Okay, Richard. Thanks a lot.

CC Roger. And we've still got several minutes left in this pass, and I'm standing by.

SC Okay.

CC Skylab, Houston. We're about a minute from LOS in Mila. We're going to see you - I'll give you a call on VHF. We've got a real low elevation pass at Carnarvon at 18:17. And going over the hill, the bird looks real good.

SC Okay. We'll see you then.

CC See you then.

PAU This is Skylab Control. That's the end of the tape. We're an hour and 16 minutes away from the next tracking station. To recap a bit, the command and

SL-II MC1370/2

Time: 07:25 CDT, 29:12:25 GMT
6/22/73

get into it but you're going to - the place - your landing spot in the Pacific is going to be just after dawn when you splashdown.

SC

(garble)

PAO

This is Skylab Control, 12 hours 34 minutes Greenwich mean time. Vanguard has loss of signal. 36-1/2 minutes away from retrofire. That burn taking place at 13 hours 10 minutes 46 seconds Greenwich mean time, or 8:10:43 Central daylight time. About 5 minutes later at 13:15:50 the crew will separate the service module from the command module. The command module will enter the atmosphere 23 minutes after retrofire, land in the Pacific about 39 minutes after retrofire. There are no more tracking stations between here and the landing point. On this revolution the command module will miss the stations in Australia, Guam, Hawaii. There will be an ARIA, an Apollo Range Instrumented Aircraft, on station in the area of where the command module will come out of the blackout period during reentry. We'll try to get communications through the ARIA at that time. At 12 hours 36 minutes Greenwich mean time, this is Skylab Control.

END OF TAPE

SL-11 NC-1371/1
Time: 08:25 CDT, 29:39:29 GMT
6/22/73

PAO This is Skylab Control at 13 hours 25 minutes Greenwich mean time. Retrofire should have occurred 14 minutes ago. And the command module should reach 400,000 feet altitude in about 9 minutes. The spacecraft should be within range of the ARIA aircraft, tracking aircraft in about 13-1/2 minutes. We conducted a communications check with that aircraft a short time ago. And voice communications were good at that time. We also heard from the recovery ship, the aircraft carrier USS Ticonderoga. Ticonderoga reports her helicopters are on station. And she is downwind of the target point. The landing area for this reentry is an ellipse, 4 by 7 miles. And Ticonderoga can be anywhere downwind of the splash point on a crossing track at the time of splash. This crew will be recovered in the spacecraft. Will not be hoisted aboard helicopters as in the past. This being done because - for several reasons. The doctors want the crew to be as inactive as possible between the time they land and the time they start their medical exams. This is part of the medical experiments of this flight. Also, a desire not to open the hatch of the command module while its on the water, so as to provide more protection to the experiment data that is aboard. The last crew to come aboard the recovery ship in a spacecraft was Tom Stafford and Gene Cernan on Gemini 9, in 1966. That was Stafford's second trip aboard the spacecraft to the deck of the carrier. He and Wally Schirra also came aboard in that fashion on Gemini 6, in 1965. The helicopters on station are identified as Recovery. This is the helicopter that will drop the swimmers, will attach the flotation collar around the spacecraft. The backup helicopter to Recovery is identified as Swin. Two other helicopters in the area will be ELS or Earth Landing Systems. This helicopter will drop swimmers in an attempt to recover the parachutes. We'd like to recover all three parachutes. And a photo-helicopter will be in the area also. The last simulation by Ticonderoga, a couple of days ago, had the spacecraft aboard the ship in about 33 to 34 minutes after splash. The ship will be hoisted to the hanger deck with a crane and about a 10-minute medical conference will ensue between Joe Kerwin, the science pilot aboard, who is a physician, and Dr. Charles Ross of the Johnson Space Center, who heads up the medical team on Ticonderoga. Dr. Kerwin will check his blood pressure while he's still in a supine position lying in the couch. He'll then set up in a vertical position and check it again. We have seen in past missions a cooling of the blood in the lower extremities. And we're not quite sure what we're going to see after 28 days with this crew. As a precaution, the crew is wearing a pressure garment on

SL-12 NO-1571/2

Time: 08:35 CDT, 18:13:25 GMT

6/27/73

the lower part of their body, similar to a G-suit worn by jet pilots, that can be inflated if they begin to have symptoms of blacking out. Dr. Kerwin will check himself and the other crew members and confer with Dr. Ross prior to hatch opening on the hanger deck of the Ticonderoga. And this medical conference expected to take about 10 minutes.

END OF TAPE

SL-11 NO-1372/1

Time: 08:30 CDT 29:13:30 GMT

6/22/73

PAO

We have the crew members on the prime helicopters in the area. We'll give those to you. The crew of Recovery: Pilot Commander Arnold Pilser, Peru, Illinois; Co-Pilot Lieutenant Jr. Grade Doug Yesensky of Idaho Falls, Idaho; and the three crewmen are Aviation Machinist Mate, First Class, John Edel of Depew, New York; Aviation Electrician Mate, Second Class, Luther Pinston of Melrose, New Mexico; Aviation Structural Mechanic, Third Class, Arthur Golts of St. Louis, Missouri. The swimmers aboard that helicopter who will attach the flotation collar are: Lieutenant Jr. Grade, Timothy R. E. Keeney of Somersville, Connecticut; Chief Radio Man John J. Garcio of Spokane, Washington; Radioman Second Class Donald A. Thompson of Oak Harbor, Washington; and Seamna Alain R. Bianco, Mr. Laurel, New Jersey. the crew of the ELS helicopter: Pilot, Lieutenant Commander Mike Dohson of Raytown, Missouri, Co-Pilot Jr. Grade Larry Denton of San Antonio Texas. The crewmen are Aviation Structural Mechanic First Class, Daniel Miotke, Troy, Michigan, and Aviation Machinist Mate, Third Class, Davis Blommer, Greenfield, Missouri. The swimmers aboard that helo who will attempt to recover the chutes are: Lieutenant Jr. Grade John L. Graham of the San Mateo, California; Engine man, Third Class, Riki J. Aike, Gardena California; Quartermaster, Third Class, Joseph J. Martinez, Makees Rocks, Pennsylvania; Hull Technician, Third Class, Howard B. Dennehy, West Cornwall, Connecticut; Quartermaster Third Class, Michael M. Davis, Salt Lake City, Utah; and Hull Technician, Third Class, Terry L. Thompson of Los Gatos, California. The crew aboard the photo helicopter: Pilot Lieutenant Mo Kindel of Arcadia, California; Co-Pilot Lieutenant John Bowin, Coronado, California; Aviation Structural Mechanic, Second Class, Dennis Conrad of Cleveland, Ohio; and Aviation Electrician's Mate, Seaman Larry Blair of Livingston, Alabama. We're getting - - We're about 5 minutes away from ARIA acquisition. We'll continue to stay up live from this point on, and hope we can get some good communications through ARIA. The command module should have passed through 400,000 feet about 26 seconds ago. Blackout schedule to begin at 13 hours 36 minutes Greenwich mean time. About a minute and a half - -

END OF TAPE

SL-11 NC1373/1
Time: 08:35 CDT, 19:13:35 GMT
6/22/73

PAO This is Skylab Control, 13 hours 36 minutes Greenwich mean time. The command module should be in blackout now. Due to end blackout 13:40:12, 8:40:12 Central daylight time, and we're due to acquire ARIA 1 second after that blackout ends. We'll continue to stand by.

PAO There is a report that the Ticonderoga has a radar contact.

PAO Range 188 miles on Ticonderoga's radar. 137 miles on Ticonderoga's radar now. Spacecraft should be out of blackout. We'll stand by. Tico reports range 95 miles. 7 - 8 miles.

END OF TAPE

SL-11 MC1374/1

Time: 08:42 CDT, 29:13:42 GMT
6/22/73

CC Skylab, Houston through the ARIA. How
do you read?
CC Skylab, Houston, through ARIA 1.
How do you read?
PAO Ticonderoga standing by.
CC - - Houston through ARIA 1. How do you read?
PAO Ticonderoga standing by for sonic boom now.
CC Skylab, Houston, through ARIA 1. How do
you read?
SC Roger. We read you loud and clear, Houston.
Everything's okay, we're out of 40,000.
CC Very good, Pate. You're in the groove.
SC And it's reading 2477 minus 2707.
CC Roger.
PAO Guidance reports the computer's reading
right on for landing.
PAO Should be getting main chutes within the next
few seconds.
PAO Should be on main chutes now.
SC Hello, Recovery. Hello, Recovery, Skylab.
On the "mains", and everything's okay.
PAO The recovery Helo spots mains also.
SC On your 0552, (garble).
CC Skylab, Skylab, this is Recovery. How
you been doing up there? Over.
SC Skylab reads you loud and clear. We'll
see you (garble) Everything's fine.
RECOVERY Skylab, Skylab, this is Recovery. How
you doing up there? Over.
SC Recovery, Recovery, Skylab. How do you read?
RECOVERY This is Recovery, loud and clear. How you
doing?
SC Roger, we're in good shape (garble).
RECOVERY Roger. You're looking good from here. We're
about 3 miles to the Northland here at this time.
SC Okay, we're out of 4500 feet and everything's
good.
RECOVERY (garble) the Ticonderoga (garble).
CC Roger. Skylab, Houston. Do your readout. Over.
SC Skylab, say again.
CC Roger. Do you have a computer readout?
Over.
SC Yes, sir, 040.78, 127.06.
CC Ticonderoga. (garble). Out.
CC (garble)
CC What'd your (garble) think?

END OF TAPE

SL-11 MO-1375/1

Time: 08:48 CDT, 29:13:48 GMT

6/22/73

RECOVERY And this is Recovery. We have a visual
below the overcast, about 100 at 050 6000, Ticonderoga.
SC Thank you.
SPEAKER This is (garble) stand by for (garble).
SPEAKER Talk to you later, stand by.
SPEAKER At my MARK (garble) 6-1/2 miles.
SPEAKER (Garble).
RECOVERY Recovery, splashdown and it looks like
stable 1,
SPEAKER (Garble) Roger. Out.
SPEAKER (Garble) swimmer is deployed.
SPEAKER Stand by for (garble) in the water.
Rolling approximately 3 to 10 degrees.
PAO Splash time 13:49:48 Greenwich mean time.
SPEAKER ELS helo is moving in.
SPEAKER First ELS swim team is deployed.
CM-CDR Hello, Recovery. Skylab, do you read?
RECOVERY Hi, this is Recovery. Read you loud
and clear. How's it going?
CM-CDR Okay. Everybody's in super shape.
RECOVERY Well, that's great. Welcome back.
CM-CDR Thank you.
RECOVERY Second ELS swim team is deployed. Ticonderoga,
do you read Skylab? Over.
TICONDEROGA Recovery, Ticonderoga. Request that you
repeat. Over.
RECOVERY Roger. Skylab reports everyone's in
super shape - super shape. Over.
TICONDEROGA (Garble) Ticonderoga. Roger. Out.
RECOVERY Third ELS swim team's deployed.
PAO Seven swimmers in the water now, one at
the command module and six attempting to recover the chutes.
The swimmer at the command module is attaching a sea anchor.
RECOVERY Swimmer signaling for the flotation collar.
PAO Recovery preparing to drop three more
swimmers and the flotation collar.
RECOVERY Swimmers are deployed with the flotation
collar.
RECOVERY Flotation collar is at the command module.
RECOVERY LS seven-man life-raft is deployed.
RECOVERY (Garble)
RECOVERY (garble)
RECOVERY (garble) Seven-man life raft is deployed
(garble) ELS.
RECOVERY (Garble) starting to attach collar. Over.
PAO Flotation collar being installed now.
And seven-man life rafts have been dropped near the chutes.
Swimmers will attach the chutes to the life rafts.

SL-11 MC-1375/2
Time: 08:48 CDT, 29:13:48 GMT
6/22/73

RECOVERY (Garble) is at three-quarters position.
RECOVERY Third ELS team has the 7-man liferaft.
RECOVERY (garble)
RECOVERY Flotation collar is in position.
RECOVERY First ELS swim team has the 7-man liferaft
inflated.
RECOVERY Second EL - has its 7 -man liferaft
inflated.
RECOVERY ELS swim team has the 7-man liferaft
inflated. Inflation of the flotation collar has begun.
PAO Ticonderoga reports that the command
module landed 6-1/2 miles from the ship. And that the ship
was at 6-1/2 miles from the target point.
RECOVERY Have completed - completed inflation of
the flotation collar. Three swimmers up on the flotation
collar, installing the bolt straps.
RECOVERY (Garble) bolt straps being installed.
RECOVERY (Garble) for the recovery raft.
RECOVERY Every raft is deployed.
CM-CDR Hello, Recovery, Skylab.
RECOVERY Hi, this is Recovery. Go ahead.
CM-CDR You're not going to pick us up with
the ship?
RECOVERY We sure are. The ship's presently
about 3-1/2 miles from you. They'll be here shortly.
CM-CDR Okay. Very good.
TICONDEROGA Recovery, Ticonderoga copied. Over,
out.
RECOVERY Skylab, this is Recovery. We're putting
on the recovery raft just so the swim people can have some place
to work on. Over.
CM-SPT Okay. Thank you.

END OF TAPE

SL-11 MC-1376/1
Time: 08:58 CDT 29:13:58 GMT
6/22/73

HELO - -place to look on (garble)?
HELO Okay, thank you.
HELO Recovery rafts inflated?
HELO Roger.
HELO Recovery rafts are fully inflated, being positioned. (garble) now has it. Parachute approximately halfway into the raft. Turn to your left. The swim team has it. The parachutes approximately halfway into the raft.
PAO Ticonderoga now 3 miles from the command module.
CM-CDR Recovery, Skylab.
RECOVERY Go, Skylab.
CM-CDR Hey, you guys want us to inflate the (garble)?
TICO Skylab, this is Ticonderoga. That is affirmative, I repeat, that is affirmative. Over.
CM-CDR Would you tell the swimmers they'll be starting; their 10 minutes is up.
TICO Roger Skylab.
HELO The recovery raft is now connected to the flotation collar.
ELS ELS (garble) the full cargos of ELS swimmers aboard.
HELO ELS - Roger. All three ELS teams are presently throwing in their parachutes up to the rafts. The (garble) tossed the (garble) line of the (garble) the third one. That's all three should tell me where the line above went approximately 60 to 85 yards. ELS (garble) out.
HELO It appears that all three ELS swim teams are still pulling in their parachutes.
HELO ARIA 1, ARIA (garble). Separation bags are in waiting.
HELO Why don't you get out a quick-look report while you're orbiting. We can get all the US (garble) out, and then when you release (garble) get the rest.
HELO Request that you send ELS swimmers to get into position and request you report when ELS swimmers have parachutes in the raft. Over.
ELS ELS wilco.
PAO As a precautionary measure, Pete Conrad has inflated the uprighting bags on the command module. It appears that all three chutes will be recovered.
HELO (garble)
PAO Ticonderoga now 1.3 miles from the command module.
PAO Ticonderoga reports being 2400 yards from the command module, 2400 yards.
HELO (garble) all four ELS rafts are together at this time at approximately 10 yards - -

END OF TAPE

SL-11 MC1377/1
Time: 09:09 CDT, 29:14:09 GMT
6/22/73

RECOVERY (garble) All four ELS rafts are together at this time. They're approximately 10 yards to the Starboard of the windline. (garble)

TICO

(garble) Ticonderoga. Roger. Out.

PAO

Ticonderoga about 1100 yards away now.

Moving into position for pickup. Meanwhile the Stylab workshop has just started its 562nd revolution. Full team of flight controllers here still monitoring the workshop. Another full team involved with the recovery of the crew - -

SPEAKER

(garble) down at this time to approximately 1,000 yards.

SPEAKER

U.S.S. Ticonderoga (garble) request that ELS swim team start off to the target. Over.

SPEAKER

(garble)

PAO

Ticonderoga slowing down now, almost to a stop. Landing occurred 22 minutes ago.

SPEAKER

Photo (garble) ELS raft (garble) Over the starboard of the windline at this time, approximately 15 yards. All ELS swimmers are together.

PAO

Range now 840 yards.

SPEAKER

ELS. (garble)

SPEAKER

(garble) The U.S.S. Ticonderoga is (garble)

PAO

Ticonderoga now about 500 yards away. There's report the APEX cover of the command module has also been recovered.

SPEAKER

(garble) Ticonderoga is possibly 400 yards from the command module.

PAO

Ticonderoga moving slowly into position now. Wood chips have been thrown into the water from the bridge to assist the Skipper in determining the drift rate as he guides the ship up to the command module.

PAO

This is a very delicate operation, requiring a high degree of seamanship. The Ticonderoga is 912 feet long, coming up along side the command module.

PAO

Linchhandlers on the ship are standing by. Spacecraft even with the bow now. Standing back with a shotline, which will be fired to the swimmers - -

PAO

Swimmers going after the shotline at this time. Landed just a little short of the command module. Swimmer has it and is heading back toward the command module. This is a light line fired from a gun. Be used to pull in the heavier line that will be attached to the command module.

PAO

The inhaul line now being attached to the command module.

SL-11 NC1377/2

Time: 0909 CDT, 29:14:09 GMT
6/22/73

PAO Line handlers on the ship will now pull the command module to a position underneath the crane.

PAO This inhaul line spins through a pulley. About 25 sailors are hauling in the command module.

PAO About 100 feet to go now to be in position under the crane, moving slowly along the starboard side of the ship.

SPEAKER Skylab, Ticonderoga. Ready to (garble)

SPEAKER Skylab, this is the Ticonderoga go ahead.

SPEAKER Roger, Skylab. I'll keep you informed as it (garble) hoisting aboard. Over.

CM-CDR Roger, roger. He's ready to go. We all got our seat belts fastened - (garble) - pleasure to ride up.

SPEAKER Roger, Skylab. You're just about below that - below the crane at this time.

SPEAKER Roger, we can see it. Thank you.

END OF TAP

SL-11 MC-1378/1

Time: 09:23 CDT, 29:14:23 GMT

6/22/73

TICONDEROGA Skylab, this is Ticonderoga, (garble) The recovery (garble) is in tact. They'll be hoisting you aboard in about a minute.

CDR Roger, roger, Ticonderoga. Thank you.

TICONDEROGA Skylab, this is Ticonderoga. You're being hoisted out of the water at this time.

PAO Command module clear of the water now. Being hoisted aboard Ticonderoga's number 3 elevator.

TICONDEROGA (garble) Ticonderoga, what do you say?

PAO The flotation collar will be removed before the command module is placed onto a dolly.

PAO Recovery dolly being moved under the command module now.

PAO The clock here showed the command module on the dolly 38-1/2 minutes after splash.

PAO The command module reaction control system thrusters have been checked for leaks and none found. As a precaution, however, plugs will be placed in those thrusters.

PAO The steps are now in place at the command module hatch, and the red carpet is being rolled out.

PAO The command module reaction control system being plugged now. After this is done, the - Dr. Ross and Dr. Kerwin will have their conference before the hatch is opened.

PAO Joe Kerwin should now be checking his blood pressure and the blood pressure of the other crewmen, preparatory to his conference with Dr. Ross. And here in the Control Center, a ladder has been placed in position, preparing to hang the first (garble) plaque in the Skylab Program in the Mission Operations Control Room.

PAO NASA Recovery Team Leader, Mel Richmond, now opening the hatch. They're going to climb out.

NEWSMAN - - perfect condition (Music). And what we thought was going to be a 15 or 20 minute interlude, isn't going to be at all. Mel Richmond opens the command module hatch, and out comes Pete Conrad, Commander of the Skylab crew, back from a successful 28 days in space. And the band of Ticonderoga strikes up "Anchors Away", saluting these three American Astronauts, all Naval Officers. They begin their walk. Dr. Kerwin appearing a bit unsteady there. Twenty-eight days of weightlessness, back into Earth's gravity under an hour. A bit shaky, but walking under his own power to the Skylab mobile laboratories set up in the - -

END OF TAPE

SL-11, MC-1379/1
Time: 08:25 CDT, 19:14:25 GMT
6/22/75

SPEAKER - - the band of the Ticonderoga strikes up "Anchors Away," saluting these three American astronauts, all Naval Officers. They begin their walk. Dr. Kerwin was appearing a bit unsteady there after 28 days of weightlessness and back into Earth's gravity under an hour. A bit shaky but walking under his own power to the Skylab Mobil Laboratory set up in the hanger bay of the Ticonderoga, where they will immediately begin what will be 6 hours of medical tests and evaluations for this first day back on Earth, and the beginning of several days of extensive medical evaluations.

PAO This is Skylab Control. Here in the Mission Control Center cigars are being lit, a lot of hands being shaken, backs being patted. On the big forward screen a replica of the Skylab crew patch and these words, "Skylab I/II mission accomplished." A tribute to the combined abilities of NASA and all support contractors, who surmounted problems to begin a new era of scientific achievement. The manned - first manned portion of this mission is over. However, this mission continues. We still have the unmanned Skylab workshop in orbit. And flight controller teams will work around the clock here in the Control Center until the next - between now and the next manned launch, now targeted for July 27. A news conference is scheduled in the main auditorium of the Johnson Space Center in approximately one half hour. NASA management news conference. Participants will be Dr. James Fletcher, the NASA Administrator, Dr. George Low, NASA Deputy Administrator, Dale Meyers, the Associate Administrator for Manned Space Flight, Dr. Christopher Kraft Jr. Director of the Johnson Space Center, Dr. Rocco Petrone Director of the Marshall Space Flight Center, Dr. Kurt Debus, Director of the Kennedy Space Center. And immediately following that news conference there will be a second conference with William Schneider, the Skylab Program Director, Kenneth Kleinknecht, the Skylab Program Manager from the Johnson Space Center, Leland Belev, the Skylab Program Manager from the Marshall Space Flight Center, Dr. Royce Hawkins Deputy Director for Medical Operations at the Johnson Space Center, Major General Kenneth R. Chapman, the DOD Manager for Manned Space Flight Support Operations, Donald K. Slayton, Director of Flight Crew Operations at the Johnson Space Center, the command module Flight Director, Phil Shaffer, Dr. Robert Parker, a Scientist Astronaut and Skylab Program Scientist. That second news conference beginning immediately after the management press conference. And the management press conference is estimated to begin in approximately 30 minutes in the main auditorium at the Johnson Space Center.

END OF TAPE